THE

AMERICAN JOURNAL OF PHARMACY.

JANUARY, 1859.

PHARMACEUTICAL NOTES OF TRAVEL.

By Edward Parrish.

Having, during the past summer, forsaken my usual professional pursuits to dip into some of the old fountains of pharmaceutical knowledge, I proceed to fulfil an implied promise by contributing some of my acquisitions, to the common stock. On a review of my notes of travel, I find that many facts which struck me as most important at the moment of learning them, have been left entirely to the tenure of a memory over-crowded with new and strange objects; while some things which arrested my attention, as in strong contrast with our home institutions, are too familiar to the readers of the Journal, through previous publications, to bear recording.

Having elsewhere contributed some hasty correspondence on the dispensing shops of London, Edinburgh and Paris, and at the Pharmaceutical Meetings of our College shown and described the principal novelties in *Materia Medica*, collected among the English and French pharmaceutists, I propose to devote this essay chiefly to the pharmaceutical organizations and institutions for instruction, and to the manufacturing establishments which, through the kindness of friends, I was permitted to visit.

At the risk of being too discursive, I shall endeavor, for my own convenience, to carry the reader to some of the most important localities visited during the tour, noting the most interesting items at each, rather than attempt a classification of the subjects treated of. The essay will thus partake rather of the narrative than of the didactic style, and if it please the general, more than the critical reader, be it so.

I entered England from the south, and so will ask the reader to go with me directly into the heart of the great Metropolis; and having visited the Tower, Saint Paul's, Westminster, the Tunnel, the Great Eastern, the Parks, Crystal Palace, and other objects of world-wide interest that absorb the attention of the astonished stranger, who finds himself for the first time in London, to accompany me to Bloomsbury Square in search of the house of the London Pharmaceutical Society. This we shall find in the immediate neighborhood of the British Museum, on a retired street, surrounded by dwellings of the better class, opposite a neat private plot of trees, flowers and green grass—off from the thoroughfares, and yet near enough to Oxford street for convenient access by omnibus from almost any part of the Metropolis.

The building, which, at the time of my late visit, was about being enlarged by the addition of the adjoining house, was originally a commodious dwelling, three stories high, "rough cast" and painted; since its purchase by the Pharmaceutical Society, it has been adapted to their use by the necessary alterations.

On the first floor is the Museum, which is lighted by two large windows fronting on the street, and adjoining it is the Council room. Back of the main stairway is the office of the Secretary of the Society, who, I understand, after the projected improvements, is to be a resident officer. The lecture room is on the second floor fronting the street, and back of it the library.

The practical laboratory consists of two divisions; one in the basement, which is used for the rougher and heavier operations, and the other in the third story, devoted to analytical processes, and the preparation of fine chemicals.

The arrangement of the laboratories struck me favorably, and the course of instruction, as explained by Professor Redwood, appeared well calculated to train up scientific pharmaceutists. The laboratories are open from 9 o'clock in the morning till 5 o'clock in the afternoon, every day except one, which is devoted to study in the Museum. Each pupil has certain articles of apparatus given him for his use, and is held responsible for the careful keeping of these. He first enters upon a course of *synthetical* operations, making and testing the principal metallic compounds; then upon *metrical* manipulations, determina-

tion of sp. gr., the preparation of test acid and alkaline solutions, alkalimetry, acidimetry and chlorimetry.

The third series includes pneumatic operations; a fourth, the purification and concentration of the inorganic acids, &c.; a fifth, experiments on sugars, starches and gums and some of their derivatives; a sixth series includes the preparation of various pigments; a seventh, vegetable extracts, infusions and some of their constituents, such as tannic and gallic acids; an eighth, alcohol and some of its derivatives and combinations, as ethers, &c.; a ninth, fatty acids, glycerin and a number of difficult pharmaceutical products; a tenth series includes the alkaloids and some other organic principles and products. The *analytical* course embraces systematic analysis and toxicological operations. The whole occupies five months, and costs the student 15*l.* 15*s.*, or about $80; he may, however, enter upon a portion only of the course at an expense of 6*l.* 6*s.*, a little over $30, per month.

A course of oral instruction, by lectures on chemistry and pharmacy, proceeds simultaneously with the practical course, the whole being under the direction of Professor Redwood, whose reputation is a guarantee of the completeness of the instruction.

I enjoyed an opportunity of hearing this distinguished teacher lecture before his class. The subject was alkaloids; those derived from plants were classified upon the black board, with reference to their Botanical origin. Aricine was mentioned among those existing in *Cinchonaceæ*. The termination in *ine* is preferred by Prof. R. in designating the alkaloids, instead of *ia* which has become almost universal with us. The New Granada barks were said to be almost exclusively used in England in the manufacture of the cinchona alkaloids.

The process for morphia sounded strangely to our American ears, so entirely accustomed to the precipitation of the infusion of opium by ammonia, with alcohol to hold up the coloring matter, and the subsequent crystallization from alcohol. The English process as recommended by Prof. Redwood produces the muriate, which in England is the principal salt, by treating the opium with water acidulated with muriatic acid, concentrating, filtering and precipitating with ammonia; the precipitate after washing is again

dissolved in muriatic acid, treated with animal charcoal, filtered, evaporated and crystallized.

After adverting to urea and its sources, Prof. R. spoke of the excrement of the boa constrictor, and other great snakes at the Zoological gardens, being nearly pure urate of ammonia, and as furnishing ample supplies of uric acid for laboratory purposes. Guano was also spoken of as an important source of this, in view of the use now made of *Murexide* as a pigment in the arts. At Manchester, I had an opportunity of visiting the extensive chemical works of Roberts, Dale & Co., and saw this new and beautiful chemical product, which in its various combinations is capable of furnishing a variety of shades of color not so readily obtainable with any other chemical agent.

Prof. Redwood is an agreeable, though not particularly fluent lecturer, his style is quiet, almost conversational, and although entering into details which appeared very complex, he maintained an assured manner, which showed a perfect familiarity with his subject. To those who feel curious about the personal characteristics of this veteran in pharmaceutical instruction, I would be glad to give a portraiture which should be satisfactory; but having no talent for that kind of description, can only say, that he is a tall, well developed figure, stooping somewhat, with a grave, though agreeable countenance, and a manner which, to the stranger who thus ventures to speak of him, will long be remembered as both dignified and cordial.

The lecture hour at the Pharmaceutical Society is 8, or 8½ o'clock, A. M., a time found very convenient in London, where business scarcely begins till after 9 o'clock, and especially favorable, as I have found by some years of observation, to a wakeful and appreciative condition of mind in both teacher and learner.

Prof. Bentley is the lecturer at this institution, on Botany and Materia Medica. The summer months are devoted to Botany, and I rose early one morning to attend his lecture at the Botanical Garden, Regent's Park, a delightful morning resort for the sedentary student, independent of the information derived upon a branch of science so necessary to a full appreciation of Materia Medica.

Each plant, as it came into view in the course of the Lecture,

was distributed among the class, which in the height of the season is quite numerous, and an opportunity was thus afforded each student to examine the characteristics pointed out by the lecturer, and to carry home a specimen to be studied at leisure. The extensive and elegant garden is further traversed by the students, who at this early hour are not molested by spectators, who visit it later in the day, and, the class being accompanied by the Professor to the beds in which the plants are grouped according to their natural affinities, have further opportunities of becoming acquainted with practical Botany.

At the period alluded to, the course was near its close, and many of the students having passed their examinations absented themselves from the Lectures, those in attendance numbering about thirty. In the museum of the Society were groups of young men studying and examining each other in anticipation of the ordeal which was to determine their fitness for the Profession of Druggist and Chemist. Their anxious expression of countenance excited sympathy, not unmixed with a sense of the ludicrous on witnessing the alarm produced by the anticipation of the "greenbox."

As is well known, the London Pharmaceutical Society embraces all of Great Britain, and being protected by a law which makes membership in it almost necessary to the Pharmaceutist, it has a large income and a corresponding influence.

By one of the most remarkable coincidences of the journey, I happened to call at the rooms for the first time on the very day of a general meeting of the Society. The occasion was one of unusual interest, in relation to the "Sale of Poisons, &c. Bill" before Parliament, and a large number were collected, so that I could scarcely have had a better opportunity of meeting with the fraternity than was thus accidentally afforded.

Hon. Jacob Bell, President of the Society, was in the chair, and first addressed the meeting, detailing the action of the Council of the Society in regard to the proposed legislation, holding up the evil consequences which must result if the bill before the House of Lords should become a law, and urging upon the members a combined and vigorous action against it.

The President is a spare man, of about medium height, with a quick and enthusiastic style of speaking, and a clear and well

connected course of argument. His assertions were well fortified by an array of facts collected with great industry and perseverance, and the earnestness of purpose which pervaded his speech excited a corresponding zeal in his hearers; this was evinced at intervals by the exclamation, *hear, hear*, which, as I heard it for the first time in a public meeting, excited the liveliest enthusiasm.

The noble Lords who had prepared the "Sale of Poisons, &c. Bill," were not spared in the course of these remarks; they were spoken of as being wholly unacquainted with the subject, and as not having endeavored to inform themselves by applying in the right quarter for aid. If he, the worthy President, had been called upon to draw a bill for the regulation of shoemakers, he should not have done so till he had put himself in communication with persons who understood the trade, so as to qualify him to draw their bill properly.

The gross blunders in the bill were pointed out in detail; its inefficiency to protect the public, and its tendency to weaken the profession of Pharmacy, by throwing the trade in poisons into the hands of any who should submit to the insufficient examination which it proposed as the only qualification for the responsible office now belonging almost exclusively to the druggists and chemists.

The selection of one physician, one apothecary, and one pharmaceutist, as the proposed Examiners to determine the fitness of the shopkeeper to deal in poisons, was also urged as an objectionable feature; the old grudge against the graduates of Apothecaries' Hall was here conspicuous, while no objection was urged against the College of Physicians occupying the position they already enjoy in England of censors over our profession. American pharmaceutists have long since declared their independence of the doctors; and indeed to the attempted interference of a medical school with the education of pharmaceutists, the Philadelphia College of Pharmacy owes its origin. In this country the physician enjoys no further right to interfere with the pharmaceutist in the exercise of his calling, than the pharmaceutist to determine upon the fitness of the physician.

Among the strongest arguments urged in these remarks against the proposed new test of fitness for selling poisons, was its in-

terference with the legitimate objects and duties of the Pharmaceutical Society. If the bill passed, the effect might be that parties would go to the Government Board and pass the examination for half-a-guinea, and thus would the necessary schools of education be deserted. The President, therefore, urged resistance to the establishment of a Government Board of Examiners in whatever shape it might be offered; if the object was that the public should not be poisoned, they should confine the sale to the members of the Pharmaceutical Society; if the government had attended to the recommendations of this Society fifteen or twenty years ago, there would be, at the present time, no ignorant men in the business.

Now, all might be called upon to submit to an examination, and if they failed in satisfying an irresponsible Board, which might be influenced by the representations of rival apothecaries, they would be ruined. This would be exceedingly unjust, and at variance with precedent, for in the Apothecaries' Act of 1815 every person then in business was exempted from its operation. In other professions matters were managed differently; in abolishing a court of law, for instance, every person interested had received a pension for life. Now, if all in business as chemists were offered an adequate pension for life, he thought many would be glad to retire at once (hear and laughter). With regard to the registration of the sales of poisons, the Council had been willing to compromise, but if done as proposed in the bill, it would take upwards of ten minutes to vend any poisonous article.

At the close of the President's speech, a spirited discussion grew up on all the particulars of the bill, which showed on the part of some of the speakers no little skill in debate. The list of proscribed poisons was shown to be most incomplete, while it contained some articles rarely or never used as poisons. Several speakers from the country towns gave it as their experience during a long series of years, that with the ordinary precautions dictated by prudence in the management of business, accidental poisoning had rarely or never occurred. The retailing of oxalic acid by the "pen'orth" seems to be very common with these, and it was stated, with much reason, that the proposed restrictions on the sale of this and other poisons, would lead to the

purchase of larger quantities at a time and increase the danger of accidents.

Some differences of sentiment were manifest in regard to the course of the Council in attempting a modification of the bill, rather than aiming, from the first, at its total defeat, and the idea was even thrown out by one, that members of the medical profession were its secret originators, and that these had too much influence upon the Council of the Society.

Considerable merriment was produced by the speech of a broad spoken Scotch member, ridiculing the fogyism of the noble Lords, who having originated nothing of value during the session, towards its close set themselves about interfering in this matter for the purpose of gaining a little credit with the country; he also adverted to the fact that they had been partial in limiting the provisions of the bill to England. They had failed to grasp the *thistle*, turned aside from the *shamrock*, and contented themselves with merely smelling the *rose*.

The resolutions condemnatory of the act were unanimously adopted by a show of hands, the English mode of taking the sense of an assembly, the members rising and holding up both hands, with the cry, *all, all, all*, designed to encourage any who were doubting, to join in the vote.

The reader may imagine with what interest an American pharmaceutist, accustomed to mingle with the pharmaceutists of his own country in their convocations, and to hear their relations to each other, to the medical profession, and to the public, discussed, would listen to a debate like this, showing the similarity of trials, of hardships, and of pleasures which attend the administration of the same important trusts on opposite sides of the Atlantic; and not a few who read this will join in the exultation which I felt in common with the members of the London Pharmaceutical Society, when it was announced that the obnoxious "Sale of Poisons, &c. bill" was withdrawn without going into the Commons, in consequence of the outside pressure of the fraternity.

The graduates of Apothecaries' Hall are a very numerous class in London; their education, though less comprehensive and scientific than that of the Medical Colleges, is thorough in the practical branches; their examinations are in Latin; the

graduates, under the name of apothecaries, practise minor surgery, and prescribe for ordinary diseases, keeping a stock of medicines, and dispensing these to their own patients and others.

The pharmaceutical chemists, who, in London, number about six hundred, do not prescribe, but keep shops and dispense medicines by physicians' prescriptions and otherwise, as with us. These obtain the diploma of the London Pharmaceutical Society, by passing an examination conducted by a Board, which is quite independent of the faculty of the school, nor is an attendance upon the school requisite before being examined. This arrangement is in strong contrast to the American, which requires at least two courses of Lectures before the examination is allowed, and thus keeps up the classes in the schools. A separate Examining Board exists in Edinburgh, where there is no regular school, though but few applicants present themselves. In several of the principal cities there are systematic courses of instruction open to students of pharmacy, facilitating their qualifying themselves for these examinations.

In some cases, these are connected with the Medical Schools, though in others they are conducted with exclusive reference to the education of Pharmaceutists. In Liverpool, a course of instruction is kept up during the winter by Dr. J. B. Edwards, a competent chemist and pharmaceutist, who has, usually, about twenty students; these, after qualifying themselves under his direction, may present themselves before the Examining Board of the parent Society, and obtain the same diploma as the students of the London School.

The practical working of the pharmaceutical business was a subject of so much interest to me, that I lost no opportunity to acquaint myself with it, and although I feel that it is delicate ground to tread upon, I shall endeavor to carry the reader a little behind the neat exteriors of some of the English shops; this I may do with the more freedom, since I saw so much to admire and approve, and so little that I could wish to suppress.

There is, in London, less show of business in proportion to the amount done, than with us; some of the most extensive pharmaceutical establishments will scarcely attract the attention of a stranger, although many of them have extensive laboratories and storehouses, and arrangements for manufacturing, either on the same premises with the dispensing shop or elsewhere.

An American, accustomed to our conspicuous corner stores, with their large bulk windows, and inviting displays of stock, would be not a little surprised to visit such an establishment as that of Allen & Hanburys, Plough Court, Lombard Street. Entering by a narrow covered passage-way, into a court-yard, on which are the fronts of several old buildings, built soon after the great fire of London, which occurred in 1666, in one of which houses, it is said, Alexander Pope was born, he will find himself in front of the dispensing shop.

This is furnished with two counters, one on either side, the longest devoted exclusively to compounding prescriptions, and the other to the sale of legitimate medicines by retail; back, is a small counting-room, and the extensive laboratories, store rooms, and stairways to the basement and upper stories also communicate with the main shop.

The prescription counter is designed for five or six to be engaged in compounding at one time. To each is appropriated a certain space, and a separate set of implements, including scales, which are held by the hand in weighing, and kept in a box when not in use; and also a small gas burner for use with sealing wax, in sealing up packages and vials. The graduated measures, perhaps twelve in number, were arranged together near a hydrant at the end of the counter, and with the other implements are washed at intervals by a female attendant.

The situation of this store is not in the midst of the dwellings of the people, but within a few hundred yards of London Bridge, in the centre of business, among the merchants and bankers, whose influence extends to the remotest corners of the earth; and yet, during the hours of business, from 10 A. M. to 5 P. M., the dispensing shop is thronged with customers from all parts of London and the suburbs, and all hands are busy with prescriptions, many of which are carried miles to their destination.

The arrangements for dispensing poisons are calculated to secure the public against accident, and to prevent an unfounded charge of carelessless being established against any of the employees. All the principal poisons used in compounding prescriptions, are kept in a separate closet adjoining the store, under lock and key. From this they are to be taken with the cognizance, in each instance, of another of the employees, who com-

pares the amount weighed or measured with that ordered in the prescription, so as to be able to testify to the correctness of the operation. The poisons which, for distinction, are in variously shaped and colored bottles, are to be immediately afterwards restored to their closet, and it is then locked. In case of an unusual quantity of a powerful remedy being prescribed, a copy of the prescription is made in a book, but in ordinary cases no care of this kind is taken, and the prescription is invariably returned to the patient, who is considered its owner.

A separate small closet is appropriated to corrosive sublimate, and to avoid the unnecessary weighing of small quantities, they keep a concentrated solution of known strength, which is stated on the label.

On one side of the dispensing shop, and with a separate entrance to the court, is a room for the reception of goods, and for putting up wholesale orders. Into this the purchased articles are brought daily and placed upon a large counter for examination by one of the firm, previously to being put away among the stock. If any article is found deficient in quality, it is immediately returned to the druggist from whom purchased, it being in London, as with us, the privilege of the purchaser to return within a limited time any sophisticated or deteriorated drug. A private laboratory for the use of the firm in testing and in experimental research is in the rear of this apartment. In this and many other large dispensing stores in England, they make a point of preparing nearly all the preparations, both chemical and galenical, dispensed at their counters; a custom which American pharmaceutists might well imitate. They are thus able to guarantee more uniformity and excellence in their medicines than can be secured by those who assume the position of mere tradesmen, buying and selling preparations of the quality of which they can have but little certain evidence.

The laboratories of this firm are situated in convenient positions. One adjoining the dispensing shop is appropriated to infusions; these are made daily, in the large quantities, generally half-a-gallon each, which experience has indicated as required by an ordinary day's business. They are all made by maceration with hot water.

In the other departments of pharmaceutical manufacture,

chiefly carried on in the basement, the apparatus used by the last generation is still employed, and the products issuing from the old macerating pans, water baths, stills, screw presses, &c., are good illustrations of the superiority of skill in manipulation over completeness and perfection in apparatus. Charcoal, and the bituminous coal so abundant in England, constitute the fuel, and the heat is, for the most part, applied directly,—not by the intervention of steam.

In convenient drying closets adjacent to the sources of heat, and pervaded by a hot atmosphere, I saw opium being dried for powdering; colchicum, which is also a leading article, was being sliced and dried for its various uses. It is not the custom of this house to make the wine of the fresh corm, as is done by some; they believe that it is a more uniform and perfect preparation when the corm has been sliced and properly dried. The end slices and skins of the corm are not rejected in making this or the other preparations. The tinctures and wines are kept in the basement in stone barrels, and drawn off by stop cocks to fill the shop bottles. Phosphorus is kept in a closet under the cellar, and the essential oils and acids in appropriate vaults. Large quantities of cod liver oil were also stowed away in jars; this valuable article is one of the important manufactures of this establishment. It is made from the livers, which are readily obtained in the London market, by placing them in a large iron pan over a coal fire, and heating to about 180° F., stirring constantly. The oil which exudes is strained and put into the jars above referred to, and into bottles of various sizes, for sale; it is not perfectly clear, nor of so very bright a color as some I have seen, but enjoys great popularity in London as a reliable article.

A very superior article of distilled cinnamon water is used in their dispensing; the flavor is remarkably fine, from its being distilled directly from the true cinnamon bark, a drug, of which, by the bye, we saw many thousands of pounds on storage in the great spice rooms at the London docks. Aqua Sambuci is another distilled water very much prescribed and especially adapted to collyria. In passing through the store rooms, our attention was arrested by original packages of Jamaica sarsaparilla, which is the kind used exclusively by this house in their

preparations,—Chiretta, the new East India tonic of the Gentian family,—Sassafras, which is imported in root, instead of the bark alone which is used with us,—Indian Bael, a new astringent,—Kamala, the peculiar glandular powder obtained from *Rottleria Tinctoria*, upon which D. Hanbury, of this firm, has written a thoroughly scientific paper; it is a specific remedy for tape worm,—Lactucarium, which, contrary to my previous ideas, I find is not made extensively in England, the German article being preferred.

The mode of preparing orange peel pursued at this establishment, furnishes a beautiful and very aromatic product; the fruit is peeled in a beautiful curled shaving, without taking off the thick, pulpy, under portion.

Elaterium is made in this establishment, of elegant quality; the process employed is nearly that given by Pereira. A large barrel, almost a hogshead, of confection of senna made by the process of the London Pharmacopœia, showed how much greater demand there is for this preparation in England than with us. Is not the reason to be found in the inferiority of the article as produced by our manufacturers?

Among the antiquities noticed were some old jars, which have probably been some seventy years in the house; the labels on two of them were *Diascordium* and *Ung. Diapomph.* (*oligos ?*)

The employees in this establishment are numerous; perhaps six "prescription clerks," besides warehousemen, porters and the female attendant, whose duties include the cooking and serving of one daily meal, or more, on the premises. Here, as well as elsewhere, we partook of the generous hospitality of the proprietors,—an opportunity highly prized from the associations which cluster round Plough Court, and make it classic ground to the pharmaceutist.

This was long the residence and place of business of the great and good William Allen, one of the most eminent philanthropists and men of science of his age. A Fellow of the Royal Society, and of the Linnæan Society, the friend and co-laborer of Davy, Dalton, Wollaston, Babington, and that army of experimental philosophers who gave such an impetus to physical science at the close of the last and beginning of the present century,—he was at the same time an active participant with

Clarkson, Wilberforce, Fox, and others, in those philanthropic labors which ended in the abolition of the African slave-trade—with Joseph Lancaster, that pioneer in popular education, in those enlarged schemes for teaching the masses, to the success of which society in both hemispheres already owes so much of progress—with Dr. Jenner, Sir Astley Cooper, and others, in realizing the beneficent results of the discovery of the antidote to small pox—and with Elizabeth Fry, and many other ministers of the Society of Friends, in ameliorating the condition of the suffering and oppressed, and carrying the consolations of religion to the abodes of wretchedness and vice.

Plough Court was the scene of William Allen's first efforts as a lecturer. The Askesian Society, which met here, was intended chiefly for the improvement of its members in philosophical studies, and he soon became a periodical lecturer before it, chemistry being his theme; this was followed by an appointment at Guy's Hospital, and afterwards at the Royal Institution, in both of which situations he was eminently successful as a public teacher. To those who are familiar with the origin of the London Pharmaceutical Society, of which William Allen was the first President, or who have read the records of his eventful life, no apology will be necessary for so full a description of the scene of his labors, even though it has occupied the space which might otherwise have been devoted to some of the other London pharmaceutical establishments.

Those of Jacob Bell, and Peter Squire, both in Oxford street, with others in different parts of London, have a reputation on this side the Atlantic which might call for a similar description of their arrangements, but in neither case were my opportunities so ample, and the already unusual length of this paper admonishes me to cut short this part of my subject.

The establishment of Squire is well known in America, as producing a superior article of extract of Cannabis Indica, a preparation which has, within a few years, attained a great reputation as an exhilerant narcotic, not liable to the ordinary objections against this class of remedies. I was informed in London, upon the best authority, that this manufacture was deservedly pre-eminent on account of the facilities of the house for procuring from the East Indies regular supplies of fresh and reliable

leaves of the plant; those which reach the London market through other sources are variable and often nearly worthless. At a manufacturing laboratory apart from the dispensing shop, they also produce a great variety of chemical and galenical preparations; all of them that I examined appeared worthy the high reputation of this house. Although honored with the patronage of Her Majesty, the Queen, the shop is not an elegant nor a very extensive one. Neither is that of Jacob Bell, which is in the same neighborhood; both bear the marks of age, and of having seen extensive service.

If the reader will next accompany me to Manchester, the home of John Dalton, he will perceive that the citizens of this most enterprising of English manufacturing towns have not been unmindful of the name and fame of the author of the Atomic Theory. In front of the City Hospital and Infirmary, on the principal street, stands his statue, and another in the vestibule of the Royal Institute, both of which are considered remarkably faithful representations.

The pharmacy of Manchester seems to present little to remark. Their organization is not well sustained. The physicians generally appear to compound their own prescriptions, and as a consequence the science and art are at a low ebb. I visited the store of Thomas Standring, a member of the Council of the London Society, and one of the most eminent of our profession. This is the only pharmaceutical store I visited in England having a mineral water drawing apparatus on the counter; it is little used, however, and has no ice-box attached. The principal manufacture of soda water is for bottling; this is done on the old plan of a force pump, worked by hand. The quality of the article produced is, however, represented as excellent, and a great deal is sold by wholesale as well as drawn from bottles at the counter. Some elegant "galenical" preparations were shown me at this establishment, and I observed that the process of displacement is thoroughly understood and practised. None of the remedies put up for sale are labelled with a description of the diseases for which they are prescribed, the reason of which is, that government imposes a tax, assessed in the shape of a stamp, on all medicines so recommended.

Among the numerous manufactories visited at Manchester,

none had a more practical interest for me than the chemical works of Roberts, Dale & Co., Cornbrook Holme. The chief products of this establishment are connected with dyeing and calico printing; in addition to *murexide* already spoken of, the following are remembered as interesting:—

The protochloride and perchloride of tin were made in large earthen vessels adjoining each other; the NO_5 used for peroxidizing the metal in preparing the perchloride being decomposed and given off, as NO_2 was passed into the other to accomplish its deoxidation. Oxalic acid is made under their own patent, by calcining together wood and caustic alkali, which produces oxalate of the alkali, a very soluble salt, easily obtained in solution, decomposed, and the acid separated and crystallized.

Nitric acid is distilled in the usual way, liberated from nitrate of soda by sulphuric acid, and the refuse sulphate of soda is conveyed to another works, where it is converted into carbonate of soda; the apparatus for distillation is of stone, the receivers being arranged like Woulf's bottles. Large quantities of soap are made in this establishment; I observed nothing peculiar, however, in the process. An arrangement for the distillation of acetic acid, which they make from acetate of lime of commerce by muriatic acid, struck me as economical of space and very convenient; from the still, which is near one corner of the room, rises a tube, which passes round the entire wall near the ceiling, at a slight inclination, being surrounded by a closed trough of cold running water, by which the acid is effectually condensed, and poured out at a suitable position into the vessels provided. The acid requires further rectification.

The manufacture of starch and British gum is on a large scale. Wheat is the material employed for producing the better qualities of starch; the flour is fermented, mixed with a large body of water, and transferred to shallow vats, slightly inclined so as to run off the refuse, and allow the pure starch to deposit. The refuse is used as a size by calico printers.

Inferior qualities of starch are made from rice and a crude sago found in the London market; the latter requires only bleaching; they are said to lose their gloss more readily by moisture. Blueing starch, which is accomplished by diffusing in it a minute quantity of ultra-marine, improves it for laundry uses.

British gum is made by pouring a very thin layer of dry starch into a highly heated iron cylinder, twenty feet long by about one foot in diameter, inclined downwards towards the lower extremity, and revolving rapidly so as to prevent charring; the product which drops out at the lower end, after traversing a single length of the cylinder, has acquired the properties of a gum, and is extensively employed in finishing textile fabrics. Great quantities of flake white are also produced in these works; this is a mixture of alum and chalk, and when thrown down with red color, extracted from Brazil wood, constitutes rose pink.

Large displacement cylinders are used for extracting oak bark and dye woods; they are connected with the boilers so as to have the advantage of steam pressure, and the decoctions are passed successively through different cylinders filled with the ground wood. The yield of extract by this process was stated to be very large.

Before leaving the subject of the last few pages, it becomes me to acknowledge my obligations to a member of this firm, to whom I am indebted for much valuable information, and whose high scientific attainments and practical skill are only equalled by his liberality and freedom from that niggardly reserve so often met with among those who avail themselves of the practical uses of science.

Manchester is a great hive of manufacturing industry; nowhere have the applications of science to the wants of civilized man been more thoroughly manifested than in her laboratories and work-shops. These contribute immensely to swell the aggregate of the nation's wealth, and through a prosperous commerce, to link the Mother Country in lasting friendship with her American offspring. Long may this continue, and long may the people of both nations co-operate in the cause of science and humanity.

We now leave Manchester, and having reached a convenient stopping-place, must reserve for a future essay, our Pharmaceutical Notes of Liverpool, Edinburgh, Glasgow, and the far-famed French Capital.

ON ELIXIR CINCHONÆ, OR ELIXIR OF CALISAYA BARK,

By Alfred B. Taylor.

Prof. Procter:—According to your desire I herewith send you for publication the Formula for "Elixir Cinchonæ," a preparation for which we have recently had a considerable demand.

Take of	Best Calisaya Bark, . .	℥iv.
	Fresh Orange Peel, . .	℥ij.
	Ceylon Cinnamon,	
	Coriander seed, *aa* .	℥j.
	Anise seed,	
	Caraway seed,	
	Cardamom seed,	
	Cochineal, *aa* . . .	ʒij.
	Brandy, ...	Oiiss.

Having bruised the articles well, and allowed them to macerate for 24 hours in sufficient of the brandy to moisten thoroughly, transfer to a displacement apparatus, and add the rest of the brandy; then displace carefully with a mixture of three parts of water and one part of alcohol, until six and a half pints of Tincture are obtained; to this add two and one half pints of simple syrup, and mix thoroughly.

PHARMACEUTICAL NOTICES.

By Charles A. Bannvart.

Glycerin Water.—Being frequently requested to make a preparation of glycerin which could not be objected to on account of its adhesive character, I found that a mixture of one drachm of glycerin, with one ounce of rose water, presented an admirable preparation, possessing all the emollient and soothing properties so much needed in excoriations. Its worth is well known to all gentlemen who use it after shaving, and as a cure for chapped hands it is invaluable.

Powder to roll pills in.—To the question, "What is the best powder or compound of powders, uniformly to be used in rolling pills, not required to be masked or coated with sugar, gelatin, or other substances," I would answer that all inodorous pills are

best rolled in lycopodium, because, being very light, extremely fine and smooth, it gives the pills a uniform appearance, and its tasteless and inodorous property is very desirable. Where the bitterness of a pill will be objected to by the palate, it is well to roll them in a mixture of one part of powdered liquorice root, to two parts of lycopodium, which will also give an even surface or coating to the pill, while its taste will be somewhat disguised.

For quinine pills, however, finely sifted arrow-root ought to be employed, as it preserves their original white color.

Podophyllin.—What is the correct chemical history of Podophyllin, as regards its solubility in menstrua, its relations to the alkalies, and other agents, &c., and why may it not be advantageously substituted for extract of jalap in the compound cathartic pills, and for scammony in the compound extract of colocynth?

To this question I would say, that Podophyllin is neutral to acid and alkalies; and as to its solubility, its properties are imparted to some extent to alcohol, diluted alcohol, water and ether; but by combining these menstrua and forming a fluid extract, of which I will speak presently, a more satisfactory result is arrived at.

Podophyllin, in its effects, acts as an alterative and cathartic, and is especially useful where the idiosyncrasy of a patient's constitution forbids the use of mercurial preparations. It rouses the liver to vigorous action, stimulates the kidneys, promotes expectoration, augments the glandular functions, and cleanses the canal of all irritating substances. Its dose, in substance, as a cathartic, is from one to three grains for a grown person; as an alterative, one-fourth of a grain. I may as well state, that it is entirely from observation that I speak, and several physicians have kindly given it a trial at my request, and in all cases with most satisfactory results.

The fluid extract above referred to, was prepared as follows:—Podophyllin, two ounces, ether, alcohol, sp. gr. ·848, water, syrup of orange peel *aa* q. s.

1*st.*—Displace the Podophyllin, previously mixed with an equal bulk of sand, with ether, until it comes through colorless, and evaporate it spontaneously.

2*d*.—Exhaust with alcohol and evaporate by water-bath to a thin syrupy consistence.

3*d*.—Next displace to exhaustion with the water, and evaporate to a syrupy consistence.

Mix these products, decant, in order to leave behind the inert waxy matter, filter, and add enough syrup of orange peel to make the whole measure twelve fluid ounces. Its color is brown, its taste is somewhat acidulous, acrid, its odor like ipecacuanha, and its dose as a cathartic is from half to one fluid drachm; as an alterative, from ten to twenty drops. Two drachms of it acted with great energy, producing vomiting and active purging. The fluid preparations of Podophyllin, on account of their unpleasant taste and odor, will never come much into vogue, as the pillular form presents a more desirable mode of administration. Its substitution for scammony in the compound

Extract of Colocynth.—It can readily be substituted, but being stronger in its effects than scammony, one-half of it will answer the same purpose as the whole quantity of the scammony ordered in the formula.

While its cost would remain unchanged, its strength would be more uniform, which is not always the case when scammony is employed, owing to the inferior qualities of it used, in the manufacture of this extract.

The formula is as follows:

Take of Colocynth, sliced and deprived of seeds, six ounces.

Aloes, in powder,	twelve "
Podophyllin,	two "
Cardamon, in powder,	one "
Castile soap,	three "
Diluted alcohol,	one gallon.

Proceed in the manner directed by the U. S. Ph. Its dose is, like the old extract, from five to thirty grains, according to the constitution of the patient.

Podophyllin can likewise be substituted for extract of jalap, in the preparation of the compound cathartic pills; and while it reduces their size three-fourths of a grain each, their cost will not be augmented, as three drachms of the extract of jalap amounts to as much as the forty-five grains of Podophyllin which takes its place. (Only one-fourth of Podophyllin is used

in substituting it for extract of jalap, as its remedial strength is greater than that of jalap.)

The following is the formula :—

Take of Comp. Ext. of Colocynth, in powder, half an ounce ;
Podophyllin, forty-five grains ;
Calomel, three drachms ;
Gamboge, in powder, forty grains.

Mix them together ; then with water form a mass, to be divided into one hundred and eighty pills.

These two preparations, unlike the former, will certainly commend themselves to the profession, as the advantage derived from them is apparent, owing to their uniform strength.

Two or three pills administered to an adult, will invariably produce from three to six evacuations, and their operation is perfectly free from any griping. They operate in from three to five hours.

Allopathic Sugar Pellets.—Acting upon the suggestion of Mr. Stearns, in his valuable paper published in the last proceedings, I present to the Association the following pellets, not prepared according to so many homœopathic attenuations, but containing in a compact, agreeable form, the full dose of the different valuable remedies they represent.

Aconitia	globules,	one-hundredth of a grain	each.
Atropia,	"	one-fiftieth,	"
Conia,	"	one-twentieth,	"
Digitalin,	"	one-fiftieth,	"
Strychnia,	"	one-thirty-second,	"
Veratria,	"	one-sixteenth.	"

The simple pellets were medicated by saturating them for twenty-four hours in an alcoholic solution of the respective principles, and agitating them in a shallow capsule until the alcohol evaporates.

Globules may be prepared thus, from all the different active principles, and they would certainly be of great service to the physician, as he could carry, in a small space, all the important drugs he is now obliged to have in large, cumbersome bottles. My reason for employing active principles instead of saturated tinctures or fluid extracts was, to preserve as much as possible

the white color of the globules, thus making them pleasing to the eye.

NOTE.—In their administration, the physician should be very careful to note their progress. One is the dose to begin with, which may be gradually increased, according to the nature of the case.

Harrisburg, Pa., Nov. 1858.

WILD CHERRY PASTILS.

Esteemed Editor,—Below I give a formula for wild cherry lozenges as I have prepared them, which may perhaps be acceptable to readers of the Journal. I think they will be found possessed of no pretended merit, nor need they be regarded as a confection, or as an excuse for a remedy, as lozenges of the kind usually are.

R.—Cortex Pruni Virginianæ,		℔j.
Amygdalæ Dulcis,		ʒiij.
Ext. Scillæ Acet.,		ʒij.
Tinct Tolu,		f.ʒi.
Pulv. Acaciæ,		ʒiv.
Aquæ, Sp. Vin. Rect.,	*aa*	q. s.

Reduce the wild cherry to a coarse powder, and extract by percolation, with a sufficiency of the alcoholic menstruum; the resulting alcoholic tincture evaporate carefully by a gentle heat to a syrupy consistence, in which dissolve the ext. squills. Add the tinct. tolu to the sugar, intimately mix, expose it to a moderate heat to expel the alcohol; blanch the almonds, and reduce in a mortar to a uniform pasty consistence; add the gum and the sugar, to which the balsam tolu has previously been added, and lastly, with this, thoroughly mix the ext. of wild cherry and squills, and water sufficient to make the proper consistency. Make pastils, each to contain fifteen grains.

In this preparation we have associated with the squill and tolu all the valuable constituents of the wild cherry bark in a concentrated form, without any of the inert matter. In the

process is involved Prof. Procter's suggestion for the development of the hydrocyanic acid of the bark, by the reaction between the emulsin of the almonds and the alcoholic extract, and thus we are enabled to obtain a concentrated medicine of the valuable wild cherry. Each pastil contains the equivalent of seven and a half grains of the wild cherry bark, one-half grain of squill and tolu, equal, or more, to the proportion contained by the ordinary syrup of tolu. A simple pastil may be prepared by omitting the squill and tolu.

WM. R. WARNER,
Phila. Nov. 2, 1858. 2d and Girard Avenue.

CITRATE OF IRON AND STRYCHNIA.

BY THE EDITOR.

At a former page of this Journal, we suggested a formula for citrate of iron and strychnia, in which the proportion of strychnia was to the citrate of iron as one to forty-eight. Since then, Messrs. Rosengarten & Sons have been supplying this empyrically constituted salt to the trade. In appearance this salt is the same as the citrate of iron, but in taste, beside the peculiar, slightly ferruginous taste of that salt, is a moderate bitterness, due to the strychnia, not, however, so decided as one would be led to suppose. One reason for again alluding to this subject, is to bring forward the following letter from a subscriber, and to suggest, that in a preparation containing strychnia there should be no variation of strength, as made by one manufacturer and another. Our readers will perceive that Mr. Heinitsh makes the salt of just one-half the strychnia strength, on the ground that a larger proportional dose of iron is considered more desirable in the cases to which the salt is applied, which would make the dose of one-sixteenth of a grain of strychnia in about six grains of the salt. We should be pleased to hear the opinions of our medical cotemporaries on this therapeutic point, that it may decide the course of apothecaries who may be called on to prepare the salt. The remarks of Mr. Heinitsh corroborate those of Dr. O'Connor, in the paper to which our first notice was appended.

Lancaster, December 13th, 1858.

To the Editor of the American Journal of Pharmacy.

DEAR SIR:—In the May number of the Journal, p. 276, (1858) you suggest a formula for citrate of iron and strychnia, the ratio of 1 to 48.

I have since August last prepared a considerable quantity, which has been used by Dr. Charles L. Baker, with very great success, in the treatment of chlorosis, especially when dependent on mental emotions, or where there has been a total suppression of the menses from any excitement.

I, however, prepare it in the ratio of 1 to 100, and it is prescribed in conjunction with Tr. Chiretta, or Tr. Chiretta and Fluid Ext. Valerian; the minimum dose of the citrate being 3 grains, which can be increased to 5 or 6, or perhaps further, should there be a necessity for more iron, without giving too large a quantity of the strychnia.

Not knowing whether the next number of the Journal will contain any articles on this new and I believe very excellent therapeutic remedy, may I ask whether you will prepare an article for publication? If so, it will be received with great pleasure and profit by the numerous readers of the Journal, and by

Yours truly, CHARLES HEINITSH.

ON THE SOLUBILITY OF STRYCHNIA IN WATER AND ALCOHOL.

Ed. Am. Journal of Pharmacy: —Respected Friend,

After considerable hesitation, and lapse of time since the experiments were commenced, we have concluded to call attention, through the columns of your Journal, to a seeming discrepancy between the statements of Wood & Bache, page 1195, U. S. D., upon the solubility of Strychnia, and the results of some experiments instituted to substantiate those statements.

During a conversation upon the properties of Strychnia, Dr. Haughton, of this city, stated upon the authority of a Pharmaceutist (?) residing here, that it was readily soluble in both water and alcohol. (On inquiring into the method the said pharmaceutist employed in producing his solutions, we found that he placed the strychnia in the solvent, permitted it to remain a few hours, then *filtered*, and of course had fine, clear solutions(?) to exhibit.)

Not feeling satisfied to permit our standard authority to be thus set at nought, we instituted some experiments, resulting as follows:

1 gr. strychnia in 1 f.ʒ. water, dissolved sufficiently to render the water somewhat bitter, but as nearly as we can ascertain

by drying and weighing the residue, no appreciable weight is lost, (our scales turning readily with one-tenth gr.)

1 gr. cryst. strychnia, in 1 f.℥. each of *officinal* and absolute alcohol, in from five to eight days.

1 and 4-5ths gr. cryst. strych. in 1 f.℥ absolute alcohol dissolved entirely in sixteen days.

½ gr. in 1 f.℥ ether dissolved in two or three days.

1 gr. in 1 f.℥ glycerin dissolved completely, all without the friendly aid of filtering paper.

Our experiments seem to indicate that strychnia, in crystals, without the aid of heat or agitation, is soluble in about 387 parts *officinal* alcohol; 179 parts absolute alcohol, and 682 parts ether.

The U. S. D., page 1195, says, "It is soluble in 6667 parts water at 50° * * * *Boiling officinal* alcohol dissolves it readily, *but deposits it on cooling.* Absolute alcohol and ether dissolve it very sparingly."

Do we interpret this language correctly in supposing them to mean strychnia is *insoluble* in officinal alcohol, and less soluble in absolute alcohol and ether than in water. If so, then our experiments and theirs conflict materially, but as we are young and unknown, we would respectfully ask some of you to testify in our behalf, if your experiments will bring you to the same conclusions.

It may be well enough to state that the full solvent powers of officinal alcohol and glycerin were not ascertained.

Should you deem this worthy of a place in your columns, please insert it. If our conclusions are false, you will confer a favor by destroying them. Respectfully,

PLUMMER & KELLY.*

[*NOTE.—This communication was received as we were in press, and too late to attempt to verify or disprove the statements it contains. We therefore reserve any comment until our next issue.—ED. AM. JOURN. PHARM.]

ON EXTRACTUM FERRI POMATUM.

By J. M. Maisch.

On the continent of Europe, a preparation is officinal in most Pharmacopœias, the virtues of which reside in the malate of iron which it contains. As many European physicians in this country habitually employ it, and neither the United States nor any of the British Pharmacopœias recognize it, it may perhaps not be out of place to say a few words here about the mode of preparing it and its medicinaluse.

Extractum Ferri Pomatum, Extr. Malatis Ferri, or Ext. Ferri Malici, is prepared by digesting one part of iron with from four to sixteen parts of unripe very tart apples, mashed to a pulp, or their expressed juice, for the space of several days, then expressing the mass, straining the liquor and evaporating it to the consistency of an extract. In selecting a method for its preparation, preference should be given to the employment of the pulp of apples, as in this case a closer and more continued contact with the iron is insured; and on occasionally stirring the mass, atmospheric air is admitted and retained by the pulp, whereby the oxidation of the iron is promoted. By most Pharmacopœias, pure iron filings are ordered, but that of Prussia, probably fearing a contamination with copper, directs iron wire, though from the presence of copper in the filings it should hardly be inferred that this poisonous metal could be retained in solution, as the large excess of iron must precipitate it during its long contact with the pulpy mass; besides, if the neutral liquor is heated to the boiling point the dissolved copper will be partly precipitated as an insoluble basic malate of copper. Such an impurity, however, for the reason stated before, cannot occur if the manipulation has been conducted right, and the employment of otherwise clean iron filings is therefore admissible. Another, and the most important point in which the Pharmacopœias differ, is the subsequent treatment of the expressed and strained liquor during the process of inspissation. While some Pharmacopœias direct it to be conducted in an iron vessel to the thickness of an extract, others order to boil the liquor for some time in an iron vessel, strain it and afterwards evaporate it to the proper consistency a porcelain dish. By the first of these methods it is evident

that the iron will be retained in the state of protoxide while the same object is accomplished by the second method until the evaporation is carried on in a porcelain dish, when an oxidation of at least a part of the iron to sesquioxide is unavoidable. The extract is very often given in solution, by itself, and as an addition to mixtures; it is therefore desirable to have it in such a state as to form a perfect solution of such a stability as not to cause a precipitate of oxide of iron, or otherwise to deteriorate. The malate of the protoxide of iron is hardly known yet, but is said not to be so easily soluble as the same salt of the sesquioxide of iron, and in accordance with that chief object of obtaining an extract of perfect solubility and stability, it must be aimed at to get rid of all those constituents of apple juice, which like albumen, would tend to deterioration, and to obtain much of the iron in the state of sesquioxide. All this is gained by the latter part of the process of the Prussian Pharmacopœia, which directs an evaporation in a porcelain dish at a temperature which would coagulate albumen, and a redissolving of the extract, filtering and again evaporating. The extract prepared in this way is of a greenish black color, is entirely soluble in water, without forming any precipitate on standing or on exposure to the air; it contains both proto- and sesquioxide, probably the magnetic oxide of iron. The directions of the Prussian Pharmacopœia may therefore be followed with some slight modifications, and the process will then be as follows:

Take of unripe apples, peeled and mashed to a pulp 6 lbs; clean iron filings ½ lb. mix and digest, stirring occasionally until the pulp has but a slight acid reaction, express the liquor, strain and evaporate it at a temperature not exceeding 163° F., stirring constantly to the consistence of an extract; redissolve this in four times its weight of distilled water, filter and again evaporate with the precaution mentioned, to the proper consistence.

The liquid preparation of this extract is called Tinctura Ferr Pomati *s.* Pomata, and is obtained by dissolving one part of the extract in six parts by weight of vinous cinnamon water, which contains nearly ¼ its weight of alcohol. This tincture is of a greenish black color, with a brown tinge and of a sweetish, slightly stiptic taste; it remains clear without separating any sediment.

The active constituent of these preparations is the malate of iron, mixed with some sugar and extractive matter; it is one of

the very mildest chalybeates, only slightly astringent, easily digestible and assimilated, and for these reasons has been and still is highly esteemed in Europe, and is much employed for all diseases which require a mild ferruginous remedy; the only drawback, if it may be considered as such, and which from the nature of the preparation cannot be avoided, is the uncertainty of the amount of iron it contains, as prepared from different apples and from apples of varying maturation; this variableness, however, is partly counteracted by the second dissolving and evaporation of the extract. The fact of its being a salt of malic acid, which is an ingredient in many wholesome fruits, might be an inducement to try its effects, inasmuch as the pure acid, and likewise the salts prepared from it, would command so high a price as to exclude almost all possibility of making use of the same in medicine.

All those chemical and pharmaceutical preparations which are incompatible with the iron salts generally, are also incompatible with the impure malate of iron; acids, especially the mineral and stronger organic acids, and their acid salts, set the malic acid free; the salts of many of the heavy metals, zinc, lead, mercury, silver, form insoluble precipitates; remedies containing tannic acid are inadmissible on account of the precipitation of tannate of iron, but caustic alkalies and their carbonates do not precipitate the oxide of iron, and are therefore chemically not incompatible with this preparation.

The dose of the extract is from about 5 to 10 grains; of the tinctures from 30 to 60 drops several times a day in the form of pills and mixture.

Philadelphia, December 1858.

EXTRACTS FROM A REPORT ON THE MEDICAL PLANTS OF MICHIGAN.

By F. Stearns.

Abies balsamea. Balsam of Fir.

Abies Canadensis. Hemlock, or Hemlock Spruce.

Abies nigra. Black Spruce.

Trees of the order Pinaceæ abound in the greatest profusion throughout both peninsulas, especially in the north; the A. bal-

samea forms one of the most beautiful of ornamental shade trees, from its perfect proportions and graceful form ; its juice, which is so much employed as a stimulant, expectorant, and vulnery, is collected in the northern peninsula, by the Ojibway Indians to some extent, but more profitably by the attachees of the Hudson's Bay Co. The Indian method of collecting it is very primitive, and consists of piercing the external hardened coating of the blister-like exudations of juice, and receiving the contents in bottles. Prepared in this way, it is of a beautiful, clear, light-straw color, and of a pleasant, aromatic odor.

The A. Canadensis, besides a valuable timber, yields a bark important to the tanner, the inner portion of which is often used in medicine for its astringency, and also the commercial oils of hemlock and spruce, and hemlock gum, or Canada pitch. The habitat of this tree is usually near streams, and in swampy spots, growing with the tamarac, from which it is easily distinguished by the fact of its losing its leaves in the spring, while the latter loses them in the fall.

There are two methods of collecting the resin of the hemlock, one of which consists of cutting cup-like incisions into the body of the living tree, and removing the soft resin as it exudes ; the other, and most common one, is to remove the wood and bark around the knobs or knots of the felled trees, which are rich in resin ; these being placed in water in a large kettle, the resin is boiled out, and rising upon the top is skimmed off and further purified by remelting and straining. The product of this method is not so good as that by the former one, the heat to which it is exposed necessarily driving off much of the essential oil. Not content, however, with making this gum by an inferior method, the collectors often put their gums into market sophisticated with common resin to the extent of seventy per cent. The commercial oils of spruce and hemlock are one and the same thing ; and are distilled from the boughs of the Abies Canadensis. The mode of proceeding is as follows, related to me by Mr. David Bales, of Livingston County, who does a large business in distilling the oil. The trees are cut down and the boughs collected only ; these are cut up fine and subjected to a distillation with water, in a portable copper still and worm, capable of holding about one hundred gallons, which is so arranged that it can be transported in the woods, and erected quickly upon a temporary

arch; two pails full of boughs (about 8 lbs.) are calculated to yield one ounce of oil, or about three pints to one running of the still, which occupies from thirteen to twenty-four hours, according to circumstances, (fuel, wind, etc.) The distilling is done only in winter, when the tree is richest in oil, and labor is cheapest; the price which the oil brings in market, is from twenty-five to forty cents per pound, upon the average. I understand that large quantities of hemlock oil are distilled in Madison Co., New York; I believe the Association a year or so ago asked information upon the manufacture of hemlock oil without success. The younger branches of the hemlock spruce are employed in domestic practice for making stimulating fomentations. From the A. nigra is made the essence of spruce, from which spruce beer was formerly made; I believe the leaves can be used for the same purpose.

Carya amara. Bitter-nut Hickory.
" *porcina.* Pig-nut Hicory.
" *sulcata.* Shellbark Hickory.

Ind.; abundant in S. of L. P.* Besides the value of this genus as timber, the leaves are aromatic and astringent, and the bark contains evidently a valuable bitter (tonic) principle, as may be inferred from the following. Mr. Caffinbury, of Constantine, St. Joseph Co., in a communication to me upon another subject, states as follows: "I think I have discovered that the inner bark of the common wild hickory (probably C. amara, F. S.) possesses an active stimulant and tonic virtue, that may be used successfully as a febrifuge. But not being a physician or pharmaceutist, and never having had an opportunity of making a scientific analysis of its chemical nature, I am not prepared to speak with certainty, and base my opinion upon experience, a few incidents of which I will present. Ten years ago I was afflicted with indigestion, attended with its usual concomitants, acidity of the stomach, morbid appetite, flatulency, diarrhœa, etc. I attributed this to the habitual use of tobacco, which, if not the prime cause of the disease, was an agent in its aggravation. As a substitute for the tobacco I selected the inner bark of the hickory on account of its pungent, saccharine and drastic qualities, I soon found my health improving, and that although

*L. P. Lower Peninsular; U. P. Upper Peninsular.

I resumed and continued the use of tobacco, I was rarely visited with indigestion; and if occasionally visited with the symptons, from having over eaten or having eaten of too rich or unwholesome food, that to chew the hickory bark and swallow its juice it would stimulate the stomach to action and correct the gastric fluid.

This success led me to prepare a strong fluid tincture of the bark, by cutting it small and putting it into pale Otard brandy. My children (three of them) were at the time sick with the disease then prevalent in this region, arising from malarious atmosphere, and known as chill fever. I gave them of this tincture three times a day, and in two days they were well. The next year I gave it to them after the first paroxysms, and a second one did not occur; since then I have used no other remedy in my family for ague, fever and other bilious diseases, and always with like success. Upon my recommendation many others have used it with like success. Many have steeped the bark and have used the infusion thus obtained, instead of the tincture. Infusion in water seems to dissolve the active matter, as the tea thus made produced the same effect as did the tincture.

From this experience, I am led to believe that an extract might be obtained from the bark of the hickory tree that would take the place of quinia in the treatment of bilious diseases, resulting from the derangement or morbid action of the liver, and the digestive system generally.

The genus Carya belongs to the order Juglandaceæ, of which the family Juglans are employed in medicine, but the authorities do not give any medical power to the Carya at all, and it may be that Mr. Caffinbury's experience is valuable to the profession.

Gaultheria procumbens. Wintergreen.

This beautiful little plant is ind., and exceedingly abundant throughout the upper portion of L. P., and the whole of the U. P.; so much so, that in many townships it covers the ground almost to the exclusion of the ordinary grasses and common wild plants; its delicately colored and flavored berry, in spring, forms the favorite food for a great variety of feathered creatures, and it is apparent that the distillation of the essential oil could be most profitably carried on in this State by means of the porta-

ble still, mentioned under the head of Abies, for distilling oil of hemlock. Large quantities of the berries are annually offered for sale in Detroit, and are simply eaten as a relish. The unusual abundance of this plant has occasioned a great variety of names being applied to it; one gentleman jokingly stated, that he seriously thought of publishing a small quarto volume of them. The following are a few of them, as employed by the people in the Wintergreen districts: Partridge Berry, Deer Berry, Aromatic Wintergreen, Three-leaved Wintergreen, Teaberry, Checkerberry, Roxberry, Wintergreen, Common Wintergreen, Pigeon Berry, Mountain Tea, etc.

The berries and leaves are both used for their pleasant aromatic, stimulating powers, but the essential oil is the product most used, and by which only is it known in medicine.

Ulmus fulva. Slippery Elm or Red Elm.

Ind. The U. fulva is very abundant throughout the middle and south of L. P. Hundreds of tons of the valuable inner bark of this tree are collected and sent East every year from our State. The following is a statement of the manner of curing, etc., this bark, as related by a person who makes it a livelihood. The Indian name in Michigan is Sharscope; time to commence collecting is 15th of May, continuing about six weeks. Best way to dry the bark is to nail up the large pieces in a room heated by a stove, or else in the direct sunlight. Must be kept from rains and dew. Requires about three days to thoroughly dry in favorable circumstances. The larger trees afford the most brittle and thick white bark, which if white brings the highest price, but which is not best for medicinal use, as the tough, stringy, thin bark affords the best and most mucilage. About half the weight of the green bark is wasted in drying. The Indians are usually paid one cent per pound for collecting the green bark, and the price of the bark when brought into market varies from five to ten dollars per cwt. In grinding the tough bark it yields two-thirds of its weight of superfine flour, and the balance is coarse ligneous powder suitable for cataplasms. I believe that considerable slippery elm bark is exported.

Proceedings Am. Pharm. Association.—1858.

THE PEPPERMINT PLANTATIONS OF MICHIGAN.

By Frederick Stearns, of Detroit.

You are all aware how conspicuous a place is occupied in our list of the Materia Medica by the essential oils, and doubtless that, of those largely produced in the United States, the oil of the *Mentha Piperita* is the most important, both in its relation to Medicine and to Commerce; and I further venture to say that, among those essential oils, there is no one of them concerning which so little is generally known of its history, culture, and production, as of this of which my paper treats.

The Association having invited reports from its members upon subjects of similar character, I trust that the following remarks, which relate more particularly to the introduction of the culture of peppermint into Michigan, the methods there employed for growing the plant, and the processes of distilling its oil, may prove of interest and value.

For the last ten years, the largest proportion of the oil of peppermint produced in the world, has been sent from one county (St. Joseph) in the south-western part of Michigan. The plant was cultivated for its oil in New York and in Ohio for many years previous to its first introduction into this State, but, from want of sufficient and authentic data, I am unable to give you any account of its early cultivation in those States, and will therefore confine my remarks, principally, to that portion of its history and culture which relates to the State in which I reside.

It was first introduced into St. Joseph County in 1835, by Calvin Sawyer, who brought the roots from Ohio, and made the first plantation on Pigeon Prairie, in the township of White Pigeon. In the spring of 1836, two farmers, named White and Earl, procuring roots from Calvin Sawyer, made plantations on the same prairie, and in the same township. In 1837, the number of plantations was increased by others; and in 1838, Marshal Craw and Lewis Ranney commenced its culture on burr oak soil, in Florence township of the same county. In the soil of these burr oak openings, as they are termed (being rich, loamy, and gently undulating, covered here and there with a scant growth of the burr, or scrub oak), the Mint was

found to produce better than on the prairie soil, where it not only required more labor to cultivate it, but was often unprofitable, from the roots being winter-killed, occasioned by the snow being blown off the level fields, and thus exposing the ground to the influence of the frost; its cultivation being abandoned on the prairies, it was thereafter limited to the township of Florence, where it has principally been cultivated ever since, there being but little over one hundred acres employed in Mint, *outside* of St. Joseph County, in the whole State.

During the first year of its production, the oil was purchased by the village merchants, and exchanged in New York City for merchandise suited to their trade. As the product increased, these merchants acted as agents for eastern dealers, who bought, sold or exported it, shipping it to Europe, where it was principally disposed of in the Liverpool market.

The Mint oil being a fancy product, and not a substantial staple commodity of commerce, the surplus, after our own and the European market was supplied, was of little value until there occurred a new demand. As a natural consequence, competition in speculation upon its purchase and sale in the City of New York became hazardous, there being many houses more or less engaged in the business. At this time (about 1844) the house of Patterson, Stone & Co., in that city, adopted the following enterprise, with the view of monopolizing the trade in Mint oil:

This house first sent an agent to Europe, to determine the amount of the demand in the Liverpool market. This he did, and ascertained it to be about 12,000 pounds per annum. They then sent another agent west, to determine the amount of the product annually. This agent found plantations in Wayne and other counties in Western New York; others still larger in the counties of Ashtabula, Geauga, and Cuyahoga, Ohio; and finally those of Florence in this State. The plantations in New York did not produce enough, those in Ohio too much, and those in Florence just about the quantity required to supply the Liverpool market. He consequently entered into contract with the producers in New York and Ohio, whereby he bound them under heavy penalties to plow up their Mint fields, and destroy the roots, and not plant any more Mint or sell or give

away any roots, or produce or sell any Mint oil for the period of five years, and paid them one dollar and fifty cents per acre as a bonus for so doing. He then contracted with the producers of St. Joseph County to pay them two dollars and fifty cents for their Mint oil, delivered at such agencies as he established in the county for that purpose, for a like period of five years, binding them under heavy forfeitures not to sell roots to any one, not to extend their own plantations themselves, and to deliver every ounce of Mint oil produced by them to the agents under the contract. These contracts continued to be observed for about three years, by the producers, when the house having gained the desired end of this monopoly, a large fortune, ceased to enforce the contracts, which, by this time, were not greatly regarded or observed by the producers. By this time, also many of the producers had amassed fortunes from their Mint product, retired from the business, and seeded down their farms; other fields had run out, and new ones converted into Mint fields; the production of the oil again became general, and has since continued so, but limited mostly to Florence.

I will now proceed to state the method of culture, and the minutiæ concerning the distillation of the oil.

The Peppermint plant requires a deep, rich, warm soil. The opening lands of Southern Michigan, which are mixed with sand, black loam, and some clay, are most productive in oil, if not in quantity of herb to the acre. The ground is prepared by deep plowing and harrowing, as for oats, potatoes, or other summer products, in early spring, say from the middle of April to the 20th of May, or as soon as an acre or so can be plowed to commence with, in order to get the roots of the Mint planted before they begin to sprout. The ground is furrowed as for potatoes, with the furrows fifteen, eighteen, or twenty-four inches apart. The roots are prepared by plowing up an old field of Mint ground, from which they are raked out with rakes, potato hooks, etc., loaded on a wagon like a load of straw, and drawn to the new Mint ground. The best roots are taken from fields planted the preceding year, and it requires about one acre of such to furnish roots enough to plant ten acres anew. The planter goes to the stack of Mint-roots in the corner of the field, or wherever they may have been deposited, fills a bag half full

of them (which are light), swings it over his neck, and under his left arm; taking a bunch of roots from the bag, he holds it in his left hand, passes along a furrow, tearing off a root, or a small parcel of the roots, as is most convenient, from the bunch in his left hand, he drops it, or them, into the furrow, covering them with his right foot, and stepping on them with his left one, as he proceeds. It is an object to plant the roots so thick in the furrow as to form a continuous connection, or chain. This is called "setting Mint." A man will set from half to three-quarters of an acre in a day.

As soon as the Mint is seen above ground, usually in three or four weeks, the horse and cultivator (the common corn cultivator) are introduced, and followed by the hoe. This process is repeated twice or three times. When the Mint has grown and spread to the size of rows of beach leaves or half grown potatoes, the hoe is again plied for the last time, in the early part of August, and this completes the culture of the crop. This keeps down the indigenous weeds, and when the mower goes into the field, in the latter part of the same month, he finds the ground nearly, if not entirely, covered with Mint.

The cutting and distilling commences about the 25th of August, and continues until the 1st of October, during which period the plant is in full inflorescence, and the lower leaves begin to grow sere. If the season has been unusually dry, and there comes a rain, the Mint is allowed to stand from one to three weeks longer than if otherwise, as it is rendered more productive of oil—wet seasons being considered more favorable than dry ones. It is cut the first year by a cradle with two fingers, and grass scythe. It is raked together in small cocks, where it is suffered to wilt ten or twelve hours. If convenient, wilting the plant, besides increasing the yield of oil slightly, enables the operator to get it more compactly into a smaller compass. From the cock, it is taken to the distillery, which will be hereafter described.

The next year there is nothing to do to the Mint field but to cut and distill its product. During this (the second year), a few weeds make their appearance, but not to the injury of the crop, though the most careful of the Mint-growers go through their fields, and destroy them as much as possible. The second

year the stalk or stem of the Mint is coarse, and the leaves not so abundant as before, so that the second crop is not so productive as the first.

The third year there is nothing to do but to harvest and distill the Mint. The stem is coarser than before, and the leaves still less abundant. The weed this year abounds, and if not removed and destroyed (a task involving much labor), half or more of the product of the field is weed, and the yield of oil and herb consequently reduced to one-half, or less than one-half, that of the first year.

The fourth year, the field is plowed up early in the spring. This, in a measure kills the weed, (this "renewing," as it is called, is sometimes done the third year, and every following third year until the field is employed for other crops,) the broken roots send up new and tender shoots, and a fair crop is again obtained without any further labor than plowing the field.

The fifth year, without any further attention, produces a crop equal to the second; after which, the field is pastured and reclaimed for other crops.

The first year produces the best quality of oil, the highest yield per acre, and the greatest yield to the quantity of herb.

Some few Mint-farmers raise the plant from the seed, carefully cultivating the ground, and protecting the young shoots from the early frosts, the Mint not being cut until the second year of its growth from the seed. Those who operate in this manner, usually re-set their fields every two years, planting them with new Mint, raised in a nursery, from the seed. Others still, plant the roots in the fall, after the crop is gathered, cultivate and hoe it in the spring following, until it reaches the height of a foot or so. After the crop is gathered, the Mint stubble is again plowed under, and harvested the second season without cultivating or hoeing.

The weed which has been mentioned is the only one the planter has to contend with after the first year's cultivation, and there is no means of entirely subduing it. After the first year, the Mint roots, which naturally tend to the surface, and the stems, which naturally tend to seek the earth, and root in it

from the joints, form a superficial network over the whole field, suppressing every other weed, and leaving no means of subduing this weed, without injuring the crop. This weed is known by the several names of *Horse-tail weed*, *Cow's-tail*, *Mare's-tail*, *Fieldbroom*, *Bitterweed*, and *Fireweed;* its botanical name, *Erechthites hieracifolius*. It grows throughout the United States in moist woods, and in the rank soil of recent clearings; its odor is peculiar, and somewhat disagreeable, depending upon a volatile oil. It is employed somewhat in medicine, particularly by the Eclectics. This plant, after it gains a foothold in the Mint field, the third year, is accompanied by June grass, both of which are cut with the Mint and go into the process of distillation with it. The Fireweed yields an essential oil of no value, which is pungent and somewhat bitter. It is the only plant which grows with the Mint that yields an essential oil. It is somewhat difficult to detect in the Mint oil, unless mixed in the ratio of more than fifty per cent., except by the specific gravity of the mixed oil; the pure Fireweed oil requires eighteen fluid ounces to weigh one pound avoirdupois, *i. e.* a quantity of weed oil equal to one pound of Mint oil in bulk weighs but fourteen ounces avoirdupois.

It will be seen from the foregoing that this weed oil finds its way into a very large proportion of the oil of Peppermint produced, either by accident or design. It has indeed often been used by unscrupulous persons and producers in adulterating their Mint oil; some have been known to distill it pure, for that purpose, from the weed gathered in waste fields and fallow grounds.

The Fireweed oil, spirits of turpentine and high proof alcohol constitute the only materials known, that are used in adulterating the pure Mint oil; though it may be presumed that bland fixed oils are often used for the same purpose. The odor, and less specific gravity of the weed oil best serves to detect its presence in Mint oil, as also that of turpentine. Washing it with water will remove the greater portion of the alcohol from oil adulterated with it. Any fixed oil contaminating it, is detected by the greasy stain such mixed oil leaves upon paper, and is removed by re-distillation. The specific gravity of pure oil Peppermint when fresh is 0·902.

It is usually of a pale yellow color, sometimes almost white, or of a slight greenish tint; as it grows old it becomes more or less oxidized, and assumes a reddish color.

The precautions necessary to produce a superior product, both as to quantity and quality, are—

1st. To distill, from new or young Mint, the first crop of rich and well cultivated land.

2d. Tight and well constructed apparatus.

3d. Cutting, wilting, and distilling the plant in still dry weather, as much oil may escape, on account of its great volatility, before it reaches the still, in windy weather, and before it can be wilted in damp, cloudy, or rainy weather. The process of distilling is facilitated much by wilting the herb, as the bulk being thereby reduced from one-third to one-half, the greater quantity can be compressed into the same capacity of the vessel used in the process of distillation.

4th. Good dry and well-preserved fuel is necessary, which, from its great combustibility, will generate steam the most rapidly.

The apparatus used in distilling the oil is—

1st. A boiler with a flat bottom of boiler iron, and a circular top of sheet iron. The boiler is about nine feet in length, and thirty inches in diameter, with three flues six inches each in diameter. The boiler is set upon a brick arch, which receives the fuel.

2d. A well and hand-pump to supply the boiler and other apparatus hereinafter described.

3d. A round tub, made of pine or whitewood staves, hooped with iron bands; the staves from one and a half to two inches thick, the tub four feet six inches deep, and six feet in diameter. This tub is set up from the ground from three to six inches, on bricks or wooden blocks; one-half or one-third of the top, or head, is constructed with the tub—that is, it is set in a groove in the staves like a barrel head, leaving an aperture of half or two-thirds of the circumference of the top. To this aperture is fitted a movable lid, which shuts down tightly, and can be, when shut down, made steam-tight by means of oakum stuffing.

4th. A cooler; being a large tub, set two feet from the ground, filled with water, and containing a worm of tinned-

iron, about one hundred feet long, the lower end of which projects through one side of the cooler, about three inches from the bottom; the upper end of the worm connects by a pipe of similar material, with the top of the first described tub, which tub is called "the steam tub," or "still."

5th. A receiver of tin, placed under the opening of the lower end of the worm. The receiver is eighteen inches deep, and ten inches in diameter; from the bottom of this there issues a discharging pipe at an angle of about 25°, similar to the spout of a coffee pot, and extends at that angle to its extremity, which stands at an elevation of an inch or two below the top of the receiver. A tube or pipe extends from the top of the boiler to the bottom of the steam tub, or still.

The whole structure is generally covered with a temporary shed, for protection against the weather—this covering being open upon the sides. Underneath the covering is erected a plank floor, twelve or fifteen feet square, to receive the Mint. This floor stands at a level with the top of the steam tub, or still.

After the boiler has been supplied with water, the fire is started in the arch, the Mint has been drawn in from the cock, and deposited on the plank floor, from whence it is pitched with a hay fork into the still, and packed down as it is thrown in, by one of the hands, who goes into the tub for that purpose, and packs it with his feet until the still can receive no more. This is called a "charge." The movable lid is then adjusted, and the steam applied from the boiler. The essential oil of the Mint passes with the steam into the worm; is condensed with it,* and passes into the receiver, where it rises to the top of the water. As the receiver gets filled, the water constantly escapes by the spout, while the oil is dipped off, and placed in cans ready to receive it. When the charge is exhausted, and yields no more oil, the steam is shut off; the lid of the steam tub, or still, thrown open, and the reeking contents removed with hay forks. This is called "Mint straw." Horned cattle and sheep are

* By exhausting each charge as rapidly as possible, by using steam under as high a pressure as the strength of the boiler will warrant, it is found that though the yield of oil is lessened, it is nearly colorless and of a firm odor.

fond of it, and will subsist upon it through the winter. It is thrown into large piles about the Mint still, after being dried, or else drawn into barns, where it lies till fed to the cattle in the winter.

The oil cans are made of the best tinned-iron, after the model of the tin powder cans, and contain each twenty pounds of oil. In these cans the oil is shipped, the small aperture at the top being soldered. Three, four, or five cans are placed in a case, the tops of which are sloped like a house roof.

There are now in this State about 2100 acres employed in producing the Mint plant, all of which, except about one hundred, are in the county of St. Joseph. It produces in oil, per acre, as follows:

Maximum	20 lb. av.
Minimum	2 "
Average	7 "

In England, at Mitcham, where the Mint plant is raised in richly manured land, the average yield is stated to be 17½ lbs. to the acre. Upon the plantations of the Messrs. Hotchkiss in Western New York, the average yield is said to be 20 lbs.

The average product per annum in this State has been as follows, from the commencement to the present time:

Maximum	30,000 lbs.
Minimum	8,000 "
Average	15,000 "

The crops vary, for several reasons. That of 1855 was large, being 30,000 pounds; the dry season following, it was reduced one sixth, *i. e.* to 25,000 pounds; and the severe cold of the winter of '56 and '57, by killing the roots, reduced the crop to one-half that of '55, it being variously estimated from 12,000 to 15,000 pounds.

The prices obtained by producers of the oil have been as follows:

Highest price per lb. . . .	$4.00
Lowest price per lb. . . .	1.25
Average price per lb. . . .	2.37

There having been as much sold at $1.25 as at $4.00, the average is taken between $1.75 and $3.00, the usual prices. The

prices ranged somewhat as following: 1844 to 1847, at $2.50; 1847 to 1852, at $1.50; 1853, at $2.00; 1854, at $4.00; 1855; at $3.50; 1856, at $2.50; 1857, the crop of which is yet partially unsold, from $2.00 to $2.50.

The land, with its improvements, is valued from $30 to $35 per acre. The cost of cultivating a Mint field the first year is $22 per acre; and for the succeeding three years, $5 a year per acre.

The following statement will show an approximation to the amount of capital invested in this industry in our State, and its returns:

2100 acres of Land and Improvements are valued at	$75,000
Total average value of Oil to producers . . .	37,500
Total cost of Production, including interest upon $75,000 at 7 per cent.	24,000
Profit to producers	13,500

This profit is over one-third the receipts for the oil, and 18 per cent. upon the capital employed. Assuming that there are 500 acres in Mint plant in Western New York, and 500 acres in Ohio, which, I presume, is nearly correct, at least a low estimate, and that the average product of the New York plantations be 12 lbs. of oil to the acre, while that of Ohio is reckoned at 8 lbs., the total annual product of these States will be 10,000 lbs., valued at $25,000—making the average value of the whole crop of oil of Peppermint produced annually in the United States to be over $63,000 to its producers.

Having in view the general interest felt by our profession in such matters, I was led to prepare this Report; and if, gentlemen, it has served to instruct, or even entertain you, I shall rest satisfied, only expressing the hope that it may induce members who possess the opportunities requisite, to convey to the Association such information as they can collect relative to those industries of our country, appertaining to our pursuits, and concerning which the general knowledge is as yet limited and indefinite.

In conclusion, I desire to express my obligations to those gentlemen interested in the Mint product throughout our State, for the valuable aid they have afforded me; particularly to Messrs. S. C. Coffinberry, and Wm. H. Roys, of Constantine.

ON THE SOLUBILITY OF THE MEDICINAL PRINCIPLES OF ALL ORGANIC MATTER IN ALCOHOL.

By Wm. S. Merrill, A. M.

In presenting my views on the above subject, I feel that I do it somewhat prematurely; I had not intended to bring them forward at this meeting of the Association, but to wait till I could more fully confirm them by experiment and illustrate them by samples. But learning that the subject of *Fluid Extracts* was exciting great interest throughout the medical profession, and was likely to be made a prominent subject of enquiry here; and as the laws which I hold to exist, lie at the foundation of all correct formulæ for making this class of preparations, I have concluded, since leaving home, to sketch out my views on this subject and present them for your consideration. I am aware that the truth of my hypothesis will be questioned, for I have yet named it to no pharmaceutist who at first gave it his assent; perhaps it will be proved false; but if true, all will admit it to be of primary importance in the science of pharmacy.

The hypothesis then, which I venture to propose, is this; that *alcohol*, in its solvent power, accurately discriminates between the *medicinal* and the *nutritive* principles of all vegetable substances, and, for the most part, of all organic matter. That, in their *normal states*, all those proximate principles of vegetation which are *medicinal* or poisonous, are soluble in pure alcohol, while all those which are *nutritive*, or capable of digestion and assimilation, are insoluble, or at most very sparingly soluble in that menstruum; and conversely, all those parts or principles of vegetables which are soluble in alcohol, are non-nutritious and incapable of sustaining animal life, and when taken into the stomach in their isolated state, more or less disturb the normal action of the animal functions; while all those parts or principles which are insoluble in that fluid, are either assimilative and nutritious, or else in consequence of the inaction of the gastric juices upon them, (as lignin, wax, caoutchouc, &c.) are inert, or act only mechanically on the system. Thus, starch, gum, gluten, pectin, vegetable albumen, glucose, sugar, fixed oils, and other analogous principles, all those elements which are digesti-

ble and capable of sustaining animal life, are insoluble in pure alcohol, while the resins, alkaloid salts, essential oils and those fixed oils which are medicinal, are soluble in that menstruum.

It is at once objected to these views, that there are many vegetable substances from which pure alcohol will not extract the medicinal virtues; that for this purpose water, dilute alcohol, acids, ether or other agents are requisite, and are hence prescribed in our pharmaceutical formulæ. It is true that to eliminate these principles in the first place from their native combinations in the plant, such agents are necessary, not because such medicinal principles are not themselves soluble in alcohol, but because they are so enveloped in and shielded by other principles which are not soluble in that menstruum that it cannot reach them.

If we dissolve a mixture of gum acacia and muriate of morphia, and reduce the solution to dryness and a coarse powder, strong alcohol will not dissolve out the morphia from that powder; not because it is not soluble in the alcohol, but because it is protected by the insoluble gum. But, if now we re-dissolve this mass and pour the solution into a proper quantity of strong alcohol, the gum will be precipitated, and the morphia remain in solution, and may thus be recovered and isolated.

So in extracting the virtues of most plants it is necessary, or at least expedient, to use other agents besides alcohol to bring into solution all their elements, and thus disengage the principles we seek. In most cases water is necessary as one of these agents, for the purpose of dissolving the nutritive principles and expanding the vegetable fibre. In some cases the medicinal elements are found enveloped in others which are not soluble either in water or alcohol, as wax, caoutchouc, and the fatty oils. Then we require ether, benzole or camphene, for their perfect and speedy elimination, but when once freed from such shielding substances the medicinal elements are all found to be soluble in alcohol alone. When the principle sought is a fixed medicinal oil, we find ether to be used to great advantage, because it dissolves that principle to the exclusion of most others, and thus presents the medicine in a very pure and concentrated form, as in the ethereal extract of ergot, capsicum, filix mas, &c., but

when so obtained, the ether may be replaced by alcohol and all that is medicinal held in solution by that grand solvent.

But while alcohol is the specific solvent of all the medicinal elements of vegetation, they are most of them while in their native combinations soluble in water also; this is the most universal solvent in nature. This alone will probably extract all the virtues of jalap and podophyllum and leave little but the inert vegetable fibre. For the resinous principles of these roots, in their natural state, are held in such intimate combination with the other elements that they are dissolved out and held in solution with them. Thus the watery extracts of such roots actually contain their medicinal virtues although greatly diluted with other non-medicinal principles. But, if that native combination is once broken up or disturbed, those resinous principles separate and are not again soluble in that menstruum. When obtained, however, by this or other injudicious processes, these resinoid principles and perhaps others originally medicinal, are liable to become so changed in their original constitution by the action of heat, water and oxygen, as to be no longer soluble in alcohol, and just so far as this is the case their medicinal properties are destroyed and they become inert. Thus the medicinal value of jalapin, podophyllin, leptandrin and the other resinoids may be correctly estimated by their solubility in alcohol, for so far as they are thus insoluble they are worthless.

Many vegetables which we habitually use as wholesome esculents, contain some elements soluble in alcohol, but these when separated and concentrated will be found to be active medicines or poison. In themselves they are not nutritious but medicinal, but in the small proportions in which they are found in our food, they may, like the pepper, and ginger and cayenne, and common salt, which we use as condiments, serve as healthful stimulants to the digestive organs, and thus aid in the assimilation of those substances which are really nutritive.

I have above advocated the truth of this hypothesis as applied to vegetable substances only; but if the bone phosphate of lime, (which I believe is not soluble in alcohol), is entirely inert, as is the opinion of Prof. Wood, then I know of no exception to its application to the whole animal kingdom also.

I wish it to be understood, however, that I contend for the

application of this law only to those proximate principles of organic matter which are properly the products of vegetable and animal life. Among the multifarious combinations of the primary elements which are the results of the destructive decomposition of vegetable and animal matter, there may be found exceptions to this rule; some preparations may be found which are medicinal or poisonous, and yet not soluble in alcohol; but that is foreign to our present enquiry.

To prove this hypothesis affirmatively would require the enumeration of every article of the vegetable Materia Medica, with testimony to the solubility of its medicinal principle in alcohol; we can therefore only offer the negative proof of challenging the production of facts that militate against it. These we believe, if any, will be found so few that the exceptions will but establish the rule.

The importance and application of this law will be readily appreciated. The particular modes of manipulation must be left to the judgment of the pharmaceutist, and must be greatly varied, according to the nature of the substance operated on.

The general rule of operation will be this: In the first place, extract from the crude material all its soluble elements, or at least be sure that we have reached and eliminated all those medicinal principles which we seek. For this purpose we may employ water, alcohol, ether, or other agents, or these combined or in succession, as experience and pharmaceutical knowledge may indicate. Then, from this primary tincture or solution, draw off, by the still or the vacuum pan, the menstruum used, and reduce the extract to a semi-fluid or syrupy consistence, leaving as little fluid as practicable to dilute the alcohol to be used, and yet retain sufficient fluidity to allow all the particles to come fully in contact with this solvent. Next weaken this semi-fluid extract with absolute alcohol, or, at least, with that of such strength as will not dissolve the nutritive and inert principles. In doing this, use, in the first place, about two-thirds or three-fourths the quantity for the proposed volume of the finished tincture, and after sufficient agitation and digestion in this, decant or filter off the clear liquid and set it aside. Treat the remaining precipitate with repeated portions of alcohol till nothing more is dissolved, and distil off the spirit from these

weaker solutions, till the quantity left, when added to the former strong solution, will make up the measure proposed. If this, from inferiority of the materials used, is not of the specific gravity adopted, it may be further concentrated.

If the material to be extracted contains any essential oil or other volatile principle, this must first be drawn off and set aside, to be added at the close of the process, or to be used as part of the menstruum in the second part of the process. This is best done, not by distilling over, but by displacing downwards by the vapor or alcohol in the vapor displacement apparatus, an improvement which we now employ. But as my object now is to develop a general law and its uses, and not to give particular formulæ, I will not dwell longer on these manipulations.

In this way alcoholic solutions may be obtained of almost any desired degree of concentration, for as the solvent power of the menstruum is no longer diminished by the presence of water or foreign matters, it becomes, in regard to many substances, limited only by the consistence of the solution. In general, however, the concentration now generally adopted for the fluid extracts, in which each fluid-drachm represents the strength of 60 grains of the material, is a convenient one, and is easily attainable with almost every plant, but other standards may be adopted, as found expedient.

We believe that pharmaceutical preparations made in accordance with the above hypothesis will be found superior in most cases, to these now in use.

In all the formulæ now in use, or which I have seen recommended for fluid extracts, much of the volatile principles of the plant are dissipated in the concentration and lost; by this plan all are preserved. In those formulæ, the removal of the alcohol necessarily results in the precipitation of the resinous principles which, when such principles predominate, as in the jalap and leptandra, the amount of sugar recommended will not keep suspended, nor the addition of one-fifth or one-fourth of alcohol, as practised by later manufacturers, hold in solution. These must therefore be removed at the expense of the medicinal power of the preparation, or else give to it a turbid and disgusting appearance. In our proposed tinctures, on the contrary,

all such principles are held in perfect and permanent solution, and they are not like the old fluid extracts, liable to change from fermentation or loss by freezing.

Such essential tinctures may be made much more perfect and definite representatives of the material from which they are prepared, than the common officinal tinctures, and may be dispensed with the greatest precision, while they are vastly superior to those old preparations, in occupying but one-eighth to one-fourth the space, and especially in their containing so small an amount of stimulant, in proportion to their medicinal power, that this ceases to be an objection to their administration. Should cases occur, which may in one out of fifty, in which the physician apprehends that the few minims contained in the prescribed dose would unfavorably affect the patient, he has only to drop the tincture on a little sugar in a tea-cup, and pour on to it a spoonful of hot water, and by the time it is well mixed and cool, all the alcohol will be dissipated, and the medicine left diffused in the sweetened water.

And here I will observe in passing, that no medicine, and especially those of an active character, should be thrown naked into the stomach in their concentrated forms. Such forms are exceedingly convenient for carrying, and for definite dispensing, and, I may add, for exhibiting to the patient as small and delicate doses; but in administering them, they should almost always be diffused in syrup, gruel, or other bland liquid. Or if in pills, they should be so combined as to render the solution in the stomach gradual and diffusive.

I may further remark, that if tinctures of the officinal strength are required, they may be instantly prepared from these concentrated solutions, by the simplest formulæ and in the greatest proportion. Or by adding them in proper quantity to warm simple syrup, beautiful medicinal syrups of any desired strength may be cheaply produced.

But it is not to the preparation of fluid extracts or concentrated tinctures only, that the law and the processes I propose are applicable. If we pour such tinctures into water, the resinoid principles will be precipitated; thus, jalapin, podophyllin, macrotin, &c., may be obtained in their purest form. If such tinctures be evaporated to the pillular consistence, they form

true alcoholic extracts, which are more active, more definite, more uniform, and more permanent, than any that can be otherwise prepared. Or again, if they do not contain fixed oils or oleo-resins, the evaporation may be carried to dryness, and the powdered extracts form convenient, definite, and powerful agents; such indeed, as are some of the so-called "concentrated medicines" now offered to the medical profession, and approved as valuable preparations.

Indeed, preparations formed in accordance with these views, will, in many cases, be found superior to the fine crystallized chemicals which have been considered the climax of pharmaceutic skill, inasmuch as in these latter the normal constitution of the medicine is always broken up, and new and artificial combinations formed, which do not act on the system precisely as the original organic salts as they exist in the plant; while in these alcoholic extracts, whether fluid, pillular, or powdered, the medicinal principles exist in combination with their own native acids or bases, and thus truly represent the plant in substance; and if our theory be true, will contain only those elements which are more or less medicinal, to the exclusion of the inert matter.

But I have extended my paper already, I fear, beyond its acceptable limits, and will therefore leave the above suggestions to the consideration and criticism of whom they may concern.

Proceedings of the American Pharmaceutical Association, 1858.

EXTRACTS FROM DR. SQUIBB'S PAPER ON THE REVISION OF THE U. S. PHARMACOPŒIA.

(From the Proceedings of the American Pharmaceutical Association, 1858.)

Argenti Nitras Fusus.

With regard to this preparation the writer has only to suggest that the number and simplicity of the tests be amended.

Lunar caustic when quite pure is not white, as usually described, but rather colorless and translucent at a point of recent fracture, and greyish externally from the action of light and organic matter. It is often but little more opaque than the crystals of similar thickness. It is crystalline and radiating from the center, upon fracture, and sometimes a little grey internally from a small proportion of reduced silver. When of

granular or homogeneous fine grained fracture, and when of an opaque or porcelanic whiteness, it may be strongly suspected of impurity. As a general rule, that presenting the handsomest appearance is most to be distrusted, or most clearly indicates the necessity of examination. It is, perhaps, better known in the pharmaceutical than in the medical profession, that a lunar caustic "No. 2" is very commonly made and sold, and is, as far as the writer has been able to ascertain, quoted upon the prices current of every manufacturing chemist in the United States. This preparation is commonly made up of 66 to 75 per cent. of nitrate of silver, and 33 to 25 per cent. of nitrate of potassa. It is put up precisely as the so-called pure or "No. 1" preparation, with the exception of a shade of color in the tint of the paper with which it is wrapped, or in the wax with which it is sealed. The bottle containing half a pound or more is often marked "No. 2" upon the wrapper or label, and this sometimes with lead pencil. But the sticks carry with them, on being dispensed and used, no indication of adulteration, and since "the trade," or the initiated only, know the slight distinctions mentioned, the preparation is liable to be sold and used as a pure article. Whatever may be the object of this half-masked adulteration, its effect and drift are unmistakably bad, and therefore the means of detection and control should be so simple and easy of application, as to insure their use as far as practicable.

The writer believes he has been fortunate enough to find a test just applicable to this necessity, and which in point of simplicity, and easy application, must leave little to be desired. A small fragment of nitrate of silver, crushed to powder with a knife blade upon a piece of paper, the powder spread out over the paper, and the paper and powder then rolled up into a small match-like roll, twisted, set on fire and burned, leaves a tasteless residue of pure silver. But if the nitrate contains even one per cent. of any saline impurity, the residue, instead of being tasteless, will have the sharp alkaline taste of the base of the adulterating salt. The little match burns rapidly with deflagration, as may be seen by those near, the carbon of the paper serving perfectly to reduce the silver, and in great measure the base of the adulterating salt also. With this test no one need be deceived by "No. 2" lunar caustic, nor by the adulteration of the crystallized nitrate with chlorate of potassa, &c., and even

the small proportion of sal prunelle that is often added to the so-called pure or "No. 1 caustic" to make it run well, is detected in a minute with equal certainty.

A solution of nitrate of silver precipitated by hydrochloric acid in excess yields a precipitate entirely soluble in ammonia. The clear supernatant liquid evaporated to dryness yields no residue whatever.

It has been ascertained by Prof. J. Lawrence Smith, of Louisville, Ky., that the addition of a small proportion of chloride of silver to the nitrate renders the sticks very tough and hard, and thus remedies a defect long felt in the use of pure lunar caustic.

He adds, before fusing, such a proportion of chloride of sodium that the fused nitrate may contain about 8 per cent. of chloride of silver, and considers this proportion as best adapted to the object in view. But this method has the serious objection of introducing a very considerable proportion of nitrate of soda into the preparation, and of diminishing its available strength by the percentage of chloride of silver, plus the percentage of nitrate of soda formed. The writer prefers to add a given quantity of hydrochloric acid to the nitrate before fusing, or while in solution; and thinks that such an addition as will give to the nitrate 5 per cent. of the chloride of silver, will be found sufficient for all useful purposes. The chloride of silver formed is entirely soluble in the concentrated solution of the nitrate, and is therefore of course perfectly disseminated through the whole quantity. So hard and tough does this admixture render the sticks of fused nitrate, that the writer believes that they might be made of two thirds the usual thickness, and yet be sufficiently strong for all practical purposes.

The formula proposed for this preparation is as follows:

Take of Nitrate of Silver,	two ounces.
Muriatic Acid,	forty grains.
Distilled Water,	half a fluid ounce.

Mix the acid and distilled water in a suitable vessel, add the nitrate of silver, and by means of a sand bath or gas flame evaporate to dryness, fuse, and cast the fused mixture in suitable moulds.

The characteristics and tests for this preparation are the same

as for that which contains no chloride. If the hydrochloric acid be of full officinal strength, it will contain just about 5 per cent. of chloride of silver.

The specimens presented are, first, that made by Dr. Smith containing 8 per cent. of chloride of silver added in the form of chloride of silver. And second, that made by the writer by the above formula.

Ferri Iodidum.

In the management of this preparation, the writer greatly prefers a modification of the process of Messrs. Smith, of Edinburgh, as given in the U. S. Dispensatory. This process as now used by the writer, reduced to the scale of the Pharmacopœia, is as follows:

Take of Iodine,	two ounces.
Iron Wire,	five drachms.
Distilled Water,	three fluid-ounces.

To the iodine and water, contained in a glass-stoppered bottle of eight ounces capacity, add the iron, and shake the mixture till it has assumed a purely green color, free from brown tinge. Then having placed a flask of proper capacity over a spirit lamp, or gas-burner which is just ready for lighting, filter the solution through a moistened filter into the flask, allowing the funnel which holds the filter to rest upon the rim of the flask neck. As soon as the filtration has commenced, light the flame beneath, and boil the solution. When the solution has all passed the filter, and the filter has been washed by the water condensed from the boiling solution, remove the funnel and filter, and introduce a long piece of clean iron wire. Boil actively till the iodide begins to thicken, and then gradually reduce the flame, and continue the heating gently till iodine vapor appears in the remaining portions of watery vapors passing off. Then extinguish the flame, and allow the flask to stand loosely stopped for half an hour to cool. Finally, break the flask over a warm dry mortar, carefully excluding the fragments of glass, break up the iodide and transfer it to small bottles with good stoppers. The net yield is 1212 grains.

Some of the advantages obtained by this management are as follows: By using so much less iron, though still a sufficient

excess, the violence of the first reaction is controlled, the stirring avoided, and by the use of a bottle the air is excluded, and the loss of iodine diminished. By the use of a smaller proportion of water the filtration and evaporation are materially shortened and smaller vessels are required. By affecting the combination without artificial heat, less risk is involved, while the operation is equally simple and easy, and more convenient. After the first active reaction subsides, the stopper may be firmly fixed, and then five or ten minutes shaking produces the characteristic clear green color, while the bottle remains entirely free from the brown stains that mark the commencement of decomposition. By filtering into the flask in the manner described, the whole solution in the flask and filter is protected during the greater part of the time by an atmosphere of steam, and the filter is washed and drained in the same atmosphere by the water condensed in and upon it, this water with the iodide falling back into the flask. The long iron wire stuck into the flask after the funnel is removed serves mainly to render the boiling equable, and prevent bumping.

The finished preparation is in bright, dry, metallic looking masses, somewhat crystalline in fracture, and wholly soluble in water. It still contains a little water that might be driven off by more protracted and more gentle heating; but as the remainder of the process would involve protracted contact of air, the resulting decomposition would more than counterbalance any advantage sought in this direction.

As sesquioxide of iron forms no combination with iodine, it might be supposed that rusty wire or filings would be as good as clean iron, and for some time the writer acted upon this supposition. Afterwards, however, he became convinced that clean iron is necessary for a good preparation.

Since it has been pretty conclusively shown that the presence of metallic iron does not prevent the separation of sesquioxide, but only serves to recombine the iodine of the original compound, it seems desirable rather to avoid the decomposition that occurs from contact of the air, than to have iron present during the evaporation. In operating on a larger scale the writer, therefore, performs the filtration, and finishes the evaporation in an atmosphere of carbonic acid, and is thus enabled to dry the pre-

paration rather more thoroughly by means of a saline bath, procuring a nicer as well as a practically better result. The drying is then continued till the iodide weighs about the sum of its constituents. Without any positive knowledge from experiment upon the subject, the writer thinks that the decomposition is always the greater, the farther the drying is carried.

Liquor Ferri Iodidi.

Here, again the writer suggests that the very large excess of iron be reduced, as in the foregoing formula. When the combination is so rapid, easy and complete, as between these two elements, it is quite useless to have so great an excess of iron.

Another objection to the officinal process for this preparation is, that in filtering the solution of the iodide into the sugar, and then shaking them till the sugar is dissolved, a bright clear solution is rarely obtained. This arises from the circumstance that almost all sugar contains particles of dust and insoluble matters, and from the practical fact that it is almost impossible to make a bright syrup without a boiling temperature, or a most tedious filtration. Almost all sugar within ordinary reach contains something that renders cold-made syrups more or less cloudy and very difficult to filter.

In view of these circumstances the writer suggests the following formula. It has now stood the test of three years experience, and produces a preparation of which those present can judge in some measure by the specimens of various ages presented. A specimen made exactly in accordance with the officinal directions is also presented for comparison. Before travelling with it, it was bright and clear enough, but had a sediment at the bottom from which the others are free, and its color is not so good, probably for reasons to be noticed farther on. These specimens have not been exposed to the light.

Take of	Iodine	two ounces.
	Iron Wire	five drachms.
	Distilled Water,	a sufficient quantity.
	Sugar	twelve ounces.

Dissolve the sugar, by means of heat, in eight fluid-ounces of boiling distilled water, and filter the syrup through paper into a tared flask of the capacity of twenty fluid-ounces or more

Then put the iodine and iron into a bottle with three fluid-ounces of distilled water, and after the active reaction has subsided, shake the bottle vigorously until a bright clear green solution, free from brown tint, is obtained. By this time the solution of the sugar will nearly all have passed through the filter. Perforate the syrup filter over the bottle containing the solution of iodide of iron, and allow the remaining unfiltered portion of the syrup to run into the solution of the iodide, and shake the mixture well. Arrange a funnel, containing a small moistened paper filter, over the flask of filtered syrup, so that the point of the funnel enters the syrup, and then filter the solution of the iodide into the syrup, keeping but a small portion of the solution in the filter, and maintaining a constant level till all has been poured in. Allow the filter to drain, without rinsing it, and finally add distilled water to the preparation till it measures, if cool, twenty fluid-ounces, or till it weighs twenty-five and a quarter ounces, shake it well, and keep it in small bottles well filled and well stopped. The process requires three hours, and yields a bright pale green solution of a s. g. of 1.348 containing a little over seven grains of iodide of iron in each fluid-drachm.

This preparation, in the few instances in which the writer has seen it in the wholesale market, has been colorless or very nearly so, or of a brown tint, and of the consistence of syrup. He therefore judges that in the wholesale market it is commonly made by the cheaper formula of the foreign Pharmacopœia, and contains only about five grains of the iodide in each fluid-drachm, with a larger proportion of sugar. This larger proportion of sugar is inconvenient and unnecessary, since with proper ordinary precautions the product of our officinal formula is not liable to deterioration. The writer deprecates the too common practice of making this preparation rather carelessly, and then setting it in the sun light to improve the color and appearance, since Mr. Maisch has shown that this treatment probably produces an iodate of the sesquioxide of iron.

From the facility with which chemical reactions take place in spongy or porous textures, whose pores contain air or gases often in a condensed state, the writer was easily led to a theoretical objection to filtering the hot solution of iodide of iron into the sugar, as in the officinal process; and he has since regarded

t

the circumstance of the color of this preparation being better when the solution is filtered into syrup, from which the air has been expelled by the heat in making it, as confirmation of the fact that there is far less air contact and far less consequent decomposition when the syrup is made beforehand.

When solutions of chloride, iodide or bromide of iron, with the chlorine, iodine or bromine, in minimum combining proportions, are brought in contact with organic matter, a portion of the haloid salt is always decomposed with separation of sesquioxide of iron. The extent of the decomposition is determined chiefly by the presence of oxygen or air, but also by the extent of the contact, by the dilution of the solution, and by the temperature of the reacting substances. Hence the writer would have as small a quantity of solution to filter as possible,—would filter this through as small a filter as possible,—would filter it cold, or cool, and with the least possible exposure to the air,—and would abstain from washing the last portions out of the filter. This last portion, if washed through, is always of a brown color, and if washed through with water containing the usual proportion of air, is very brown.

Fortunately, the solution, when not embarrassed by the debris of a large excess of iron passes through a filter very readily, and very rapidly; so that by ordinary care and precaution, a very perfect, and so to speak, a very chemical preparation may be easily obtained, in which the beginnings of evil have been successfully opposed.

The writer is disposed to resume or re-incorporate the direction to preserve this preparation from the light, since by long exposure to light it loses its fine pale-green color and becomes colorless, with probably a material change of composition, and possibly of medicinal effect. Indeed, as a general rule, medicinal substances should be excluded from light to a far greater degree than at present obtains in practice; and it would be an important step in the right direction, to have some of the white painted shelves of dispensing establishments replaced by closets. Concentrated ether, exposed to sunlight for an hour of each day, soon acquires a strong, disagreeable, pungent, and often empyreumatic odor, becomes acid, and altogether unfit for use, through partial decomposition. Chloroform, under similar cir-

cumstances, gives an odor of chlorine and muriatic acid, and produces a yellow, oily liquid, which collects around the edges of the surface in contact with the bottle. Spirit of nitre becomes colorless and acid in a few hours. Hoffmann's anodyne becomes quite acid, and many tinctures and powders change their sensible properties materially.

Hydrargyri Iodidum.

In a chemical point of view, this preparation may be regarded as one of the most indefinite and uncertain of the Materia Medica; whilst therapeutically it is certainly very far from being what is desired. From being mild and manageable at times, it varies so that harsh and even violent effects are not unfrequently encountered from its use. As prepared strictly in accordance with the Pharmacopœia, it always contains the red iodide, and this in various proportions, according to slight variations in the management. So that it must have been an oversight in those who constructed the present formula, that a careful washing with strong alcohol was omitted. When made by the officinal formula, in the dark, or by artificial light, carefully and thoroughly washed by digestion and decantation with strong alcohol, dried in the dark, and then carefully preserved from the light, it is probably in its best condition for therapeutic application. But even then, though free from red iodide it contains a large preportion of the yellow or subiodide, and of metallic mercury. And these proportions vary, probably, every time it is made, even though made by the same person from the same materials. The writer has occasionally seen it so free from metallic mercury that it would but slightly amalgamate a surface of gold foil when rubbed upon it, but has never seen a specimen, however carefully made, or by whatever process, that would not very sensibly affect the gold when rubbed upon it; whilst two specimens made as far as practicable in the same manner, would affect the gold differently. The proportion of yellow iodide must of course vary with the proportion of metallic mercury, and thus the color of the preparation, as commonly met with, is almost always different. It is generally described as being green or yellowish green, but when well washed it is, though of varying tint, always of a greenish yellow color; the brighter

and more lively in color the better, provided it be thoroughly dry. That which has a dead color, approaching to a dull olive, always contains largely of metallic mercury, and iodides that have been subjected to the action of light and moisture.

The preparation should never be dispensed without the most careful testing, and it is fortunate that this testing is very simply and easily performed. A small quantity of iodide of mercury rubbed in a mortar with a little strong alcohol, if it contains any red iodide, will invariably exhibit a red coloration in the track of the pestle as the alcohol evaporates from the surface of the mortar. Or, if a portion to be examined be shaken in a test tube with alcohol, and the alcohol evaporated from a porcelain or glass surface, the most minute proportion of red iodide becomes visible. If it be desired to estimate the quantity,—or rather to establish the presence of metallic mercury,—the iodide should be rubbed with a moderate degree of pressure upon any surface of gold.

In concluding the unsatisfactory notice of this preparation, the writer submits the opinion that, unless some discriminating solvent can be found for the separation of these lower iodides of mercury, it is adapted to medical use.

Hydrargyri Iodidum Rubrum.

Some years ago Dublanc proposed to prepare this iodide by a process of direct combination through the intervention of alcohol, and the writer has found a slight modification of M. Dublanc's process much more easy, convenient, and economical than the officinal one, while it is only liable to the objection that it necessarily contains the insoluble impurities of the materials; an objection of but little practical weight, since it has never been urged in the case of the green iodide, though that is given in much larger doses.

Take of Mercury,	one ounce.
Iodine,	ten drachms.
Alcohol,	four fluid-ounces.

Introduce the mercury, iodine, and half the alcohol into a four-ounce vial, and shake the mixture occasionally during two days, or until the combination is effected. Should the alcohol become colorless during the process, iodine in minute portions

should be added until the alcohol retains a brown color after shaking and digestion. Transfer the contents of the bottle to a paper filter, and when the colored alcohol has drained off wash the iodide with the remainder of the alcohol, and dry it by a gentle heat. The yield is ten hundred and sixty-two grains.

It is thought that the simplicity and convenience of this formula adapt it better to the practice of the pharmaceutist than any yet tried, whilst it yields a preparation not inferior to that of the officinal formula.

Morphiæ Sulphas.

Upon a comparison of the medicinal activity of this preparation as made by the officinal formula, and as found in the market from the largest manufacturers, it becomes evident that a much larger dose of the latter is required to produce similar effects. This same deficiency in the commercial preparation is indicated by the circumstance that of late years very much larger doses are commonly prescribed. The dose indicated by authoritative works on therapeutics is one-sixth to one-third of a grain, this being medicinally equivalent to one and two grains of opium. But whilst opium itself has been reduced in medicinal value by the various new expedients, such as yolks of eggs, &c., till the effective dose has been very materially augmented, sulphate of morphia is now rarely prescribed in less than quarter grain doses, often in doses of three quarters of a grain, and sometimes in one grain doses, to obtain its legitimate sedative effect; and this exclusive of those cases wherein, from habitual use or idiosyncrasy, large quantities are required. There must be some reason for this, and the subject is referred to in order to suggest investigation and research. The author having made no research, must rest satisfied with stating the fact, upon his own and his professional friends' observation, that the preparation of the Pharmacopœia is more active than that of commerce; and farther, that he believes that the deficiency of the latter in effective value is not due to fraudulent admixture or adulteration, but to faulty manipulation, whereby a portion of soluble but inert, and for the most part uncrystallizable matter, is entangled in the crystals with the mother liquors, and dried and sold with them, thus increasing the percentage yield. Within the past seven

years the writer has examined some twelve samples of opium, ten of which were purchased for the army and navy, where profits were not at stake, and price a secondary object. In four instances the portion examined was from the powder resulting from the careful drying and powdering of half a case; while in all the remainder, the samples were selected with care from various lumps, whenever such selection was possible. Several other examinations were made where no selection was possible, but the results were all below those now to be given. In no instance of these examinations did the yield of crude morphia exceed 8.1 per cent., whilst the average of the specimens was scarcely above 7.6 per cent. If this may be taken as expressing the condition of the general market for this drug, the common statement of authoritative writers, that good opium contains from ten to twelve per cent. of morphia, now needs re-examination and revision.

The relative expense of opium and salts of morphia taken in connection with the troublesome and expensive process of extraction and manufacture leads to the inference that manufacturers, to be able to sell the preparation at fair profits, must obtain much greater yields than would be indicated by the examination of any opium the writer has ever met with.

Zinci Chloridum.

The writer agrees with Dr. Bache, (see U. S. Dispensatory, 11th ed. p. 1351,) that the fused chloride is by far the most eligible preparation, for many reasons. First, it is a matter of some difficulty to dry the salt as directed in the Pharmacopœia, since a portion of it is very liable to fuse before other portions are dry. Again, after fusion it is much more easily managed, collected and preserved without material deliquescence; and finally, it is far more easily applied to the ordinary purposes for which it is used, and occupies much less space. The fusion is easily effected in the evaporating basin in which the solution has been concentrated, and requires only a gas or lamp flame to effect it. With proper care, therefore, it becomes quite useless to transfer it to a crucible.

Should the chloride become colored from the organic matter of filters, from dust or other like causes, as it is very liable to do

during the rather tedious evaporation, a few drops of nitric acid stirred into the fusing salt clears it at once, by converting all the carbonaceous matters into carbonic acid, which latter, of course, flies off with the excess of nitric acid.

The writer has never used the officinal process for this preparation, having at first given a preference, upon theoretical grounds, to that wherein the iron is precipitated by freshly prepared oxide of zinc and chlorine, and from having been well satisfied with the results obtained.

ON MELEZITOSE, A NEW SPECIES OF SUGAR.

By M. Berthelot.

In pursuing the study of the saccharine matters, I found, some years ago, in the manna of Briançon—a saccharine exudation produced by the larch (méléze) and formerly employed in pharmacy—a new sugar analogous to cane sugar, but of which I was unable to follow up the study, from want of matter. Having since then succeeded in procuring a sufficient sample of this manna, thanks to the kindness of M. Meissas, formerly Professor of Mathematics at the Lycée Napoleon, I resumed the study of it, and I succeeded in isolating and characterising the sugar which it contains; it is a new substance, very interesting from its analogy to cane sugar; I shall designate it by the name of *melezitose*.

To extract it, the manna of Briançon is treated with boiling alcohol, evaporated to the consistence of an extract, and left to itself for some weeks. Melezitose crystallises in a syrupy mother-liquor; it is compressed, washed with warm alcohol, and re-crystallised in boiling alcohol; very small, hard and brilliant crystals are thus obtained: examined in the microscope, they appeared to be oblique rhomboidal prisms, analogous to those of cane sugar. I could not obtain them of sufficient size to measure their angles. These crystals, viewed in the mass, present an opaque appearance, which isolated crystals do not. Their taste is sweet, analogous to that of glucose, and consequently much weaker than that of cane sugar. They are very soluble in water, almost insoluble in cold alcohol, sparingly sol-

uble in boiling ordinary alcohol. Absolute alcohol added to a concentrated aqueous solution of melezitose, precipitates it slowly under the crystallised form; its aqueous solution left to spontaneous evaporation becomes syrupy and remains for a long time without crystallising.

Melezitose, dried at 110° C. (230° F.) presents the same composition as cane sugar, and corresponds to the formula $C^{12}H^{11}O^{11}$. Below 140° C. (284° F.), it fuses into a transparent liquid, without undergoing any appreciable alteration. Its reactions are like those of cane sugar. It does not perceptibly reduce the potassio-tartrate of copper, and is not destroyed at 100° C. (212° F,), by the alkalies; but concentrated sulphuric acid carbonises it cold; under the influence of boiling hydrochloric acid, it rapidly turns brown. Dilute sulphuric acid metamorphoses it at 100° C. (212° F.) into a sugar analogous to, or identical with, glucose, capable of reducing the potassio-tartrate of copper, and destructible at 100° C. (212° F.) by the alkalies. Nitric acid converts it into oxalic acid, without mucic acid. Ammonio-acetate of lead precipitates it. Melezitose, treated with yeast, ferments only slowly and incompletely, and sometimes does not do so at all; but when it has been modified by sulphuric acid, it ferments immediately, and is almost entirely converted into alcohol and carbonic acid.

Its rotary power, at 20° C. (68° F.), deduced from a solution of 1-5th, and brought to the tint of passage, is equal to +90°·3. A solution containing 1-100th of sulphuric acid deviated +17°7′, heated to 100° C. (212° F.) for ten minutes, +12°2′; for an hour, +9°′8; two hours, 9°8.

Thus, the rotary power of melezitose is higher by one-fourth than that of cane sugar; under the influence of sulphuric acid, it diminishes more slowly than that of cane sugar, and does not change in sign, whereas cane sugar is interverted; this remark is essential. The rotary power of modified melezitose is almost identical with that of glucose.

These characters, added to the feebler saccharine taste and the much greater difficulty of fermentation, distinguish melezitose from cane sugar.

Trehalose is distinguished from melezitose by its rotary power,

which is equal to +208 degrees, and especially by a greater stability.

As regards melitose, it possesses a rotary power scarcely differing from that of melezitose, and which varies in the same way under the influence of sulphuric acid. But melitose ferments much more easily, and with a special character, for it ferments only by half; moreover, it furnishes mucic acid.

From these facts, we see that cane sugar, long isolated by its character, becomes the type of a category of saccharine bodies, whose number goes on always multiplying. The same remark also applies to grape sugar.

Indeed, the word glucose, formerly applied to grape sugar only, now designates a whole series of distinct saccharine principles, such as grape glucose, malt glucose, the glucose of fruits, of ligneous matter, lactic glucose, and perhaps the glucose of gum, &c.; all these glucoses are saccharine bodies, directly fermentable, alterable by the alkalies, capable of reducing potassio-tartrate of copper, &c.

In the same way, by the side of cane sugar, are grouped various difficultly fermentable sugars, unalterable at 100° C. (212° F.) by the alkalies and by potassio-tartrate of copper, represented at 130° C. (266° F.) by the formula $C^{12}H^{11}O^{11}$, modified by the acids, and converted into new sugars belonging to the category of the glucoses.

I found some years ago the first example of this new series of sugars analogous to cane sugar, *melitose;* last year, I published a second example, trehalose. The mycose of Mitscherlich, since discovered, and melezitose, increase the number of sugars of this group.

It will henceforth be essential to take account of these results in analytical researches relating to the study of saccharine matters, and no longer to confound with cane sugar analogous sugars, as doubtless has been done more than once, or relying only on the general reactions which their solutions present, and without seeking to isolate the sugars themselves in the pure state.

These results merit attention no less in a synthetical point of view; they prove that the artificial formation of cane sugar is

a more complicated problem than was supposed so long as no isomeric sugar was known. Indeed, the processes by which such a sugar might be produced, unless they are discovered by chance and by accident, must rest on the comparative study of these different isomeric principles, and furnish the general law of their formation.—*London Chemist, Oct.*, 1858, *from Comptes Rendus, Aug.* 2, 1858.

CITROMEL AND TARTROMEL OF IODIDE OF IRON.

By Mr. John Horncastle.

So many able experimentalists have been engaged in the production and improvement of the preparations of iodide of iron, that I feel some diffidence in inviting attention to two new combinations, fearing I might lay myself open to the charge of wishing to increase their number, without adequate advantage in the improvement of their quality. But as all the preparations at present in use are in some respects defective, especially as regards their stability, I feel confident that my investigations have been directed to a useful object, and hope the results will be interesting to the Members of the Pharmaceutical Society.

About six years ago I was informed by Mr. C. F. Palmer, of Birmingham, that citric acid would prevent the spontaneous decomposition of solutions of iodide of iron. Conceiving that this property of the acid might be made available for preserving solutions for officinal use, I commenced a series of experiments, to ascertain the extent of its preservative powers, and likewise whether the other common vegetable acids, viz., the tartaric and acetic, possessed similar properties.

Six solutions were made, each containing five grains of iodide of iron in a fluid ounce of distilled water, and to five of them citric acid was added, in proportions varying from one to five grains. All the solutions were perfectly clear and colorless.—They were put into ounce-and-half phials, not corked, but the mouths covered with paper, to keep out the dust, and placed in a window where they were freely exposed to the light, though usually shaded by a blind from the direct rays of the sun. They were examined and tested with starch paper at intervals of a few days. The solution which contained no citric acid had de-

posited a considerable quantity of brownish-yellow powder, and exhibited other signs of being in an advanced stage of decomposition at the end of a week; whereas, no indication of decomposition could be detected in the other solutions till the following periods:

Solution with	1 grain	of citric acid,	21	days.
"	2 grains	"	30	"
"	3 "	"	60	"
"	4 "	"	74	"
"	5 "	"	93	"

With much stronger solutions (one part to two, four, &c., of water), citric acid was found to hasten rather than retard decomposition.

Similar courses of experiments were tried with acetic and tartaric acids. The former prevented the deposition of oxide of iron, but not the separation of free iodine, and therefore failed to fulfil the most important requirement. The latter answered even better than citric acid. Solutions were prepared in the same manner as above, substituting tartaric for citric acid, and exposed to the same rigid test of their stability. The solution containing one grain of acid gave no indication of decomposition till after the lapse of ninety-four days, and the others not till from seven to eight months, when they began to change almost simultaneously. The length of time these solutions were preserved, was not so regularly proportionate to the quantities of acid as in the experiments with citric acid. In strong solutions tartaric acid exerted no preservative influence.

It appears, then, that citric and tartaric acids would be useful additions to weak solutions of iodide of iron intended to be kept for only a moderate period, as is usually the case with the medicines supplied to patients; but for preserving stronger solutions, such as would be adapted for officinal use, they are quite ineffectual. I have therefore tried them in conjunction with saccharine matter, and on account of the liability of cane sugar to be converted into the less soluble grape sugar, I selected clarified honey, and found the combination a very perfect vehicle for iodide of iron. The following are the formulæ I have adopted:

Citromel Ferri Iodidi.

R. Liq. Ferri Iodidi, f.℥j.
Mellis, ℥xij.
Acidi Citrici, ʒvj.
Aquæ Distill. Bullient., f.℥j. vel q. s.

Liquify the honey by means of heat, and add, first the citric acid previously dissolved in the water, then the solution of iodide of iron; mix well together, making up f.℥xij. with distilled water, and filter.

Tartromel Ferri Iodidi.

R. Liq. Ferri Iodidi, f.℥j.
Mellis, ℥xij.
Acidi Tartarici, ℥ss.
Aquæ Distillat. Bullient., f.℥j. vel q. s.

Proceed as directed for the Citromel.

These preparations are about the same strength as the syrup of the Pharmacopœia.

The Liquor Ferri Iodidi indicated contains an ounce of iodide in a fluid ounce, and may be conveniently made as follows:—

Take of Purified Iodine, ℥ivss.
Iron Wire or Filings, ℥iss.
Distilled Water, q. s,

Put the iron into a flask with three ounces of distilled water, and add the iodine a little at a time, allowing the solution to cool after each addition. When the whole has been added, set aside for a day or two and then filter, washing the insoluble residue with sufficient recently boiled distilled water to make up five fluid ounces and a half of clear solution.

The Citromel and Tartromel Ferri Iodidi will keep for an almost unlimited period, even in bottles that are frequently opened to take out small quantities. They will also keep well when diluted, and in this respect they have a remarkable superiority over the syrup of iodide of iron. The following mixture has been kept more than a year without any particular care, and did not manifest the slightest tendency to decomposition:—

R. Citromellis Ferri Iodidi, f.ʒj.
Tinct. Gentianæ Com., f.ʒj.
Aquæ Distillatæ, f.ʒxiv. M.

I shall not attempt to explain the modus operandi of the citric

and tartaric acids, but will merely observe that they do not appear to enter into chemical combination with the iodide, as their effect is not dependent upon any definite proportions.

Having stated the results of my own experiments, I must leave it to the judgment and experience of others to decide whether these preparations are worthy of a place in the catalogue of remedial agents. They will require the test of longer and more extensive employment to establish their claim, but I feel assured they will be found to possess some valuable characteristics that will recommend them to both the Pharmaceutical and Medical professions.—*London Pharm. Journ. Nov.* 1858.

ON THE PREPARATION OF SOME PURE SULPHATES, AND PARTICULARLY SULPHATE OF COPPER.

By Henry Wurtz, Prof. Chem. Med. Coll., Washington.

Commercial *blue vitriol* always contains sulphate of protoxyd of iron, which cannot be separated by crystallization, owing to the fact, determined by Mitscherlich, that ferrous sulphate, when crystallizing with sulphate of copper, assumes the pentehydrated composition and triclinic form of the latter, and forms with it homogeneous crystals. It has appeared to me desirable, therefore, that some special method be devised for the separation of the iron, both in order that the chemist may possess a source of pure compounds of copper, and because the prescence of iron must be injurious in those processes of dyeing, calico-printing, etc., in which blue vitriol is used, and in the preparation of the cupriferous pigments, *verdigris*, *Paris green*, etc.

In undertaking this, my aim has been to produce a method by which the iron may be directly separated or abstracted from the solution without the permanent introduction of any foreign substance. My process consists essentially of two steps; the first of which is the conversion of the ferrous into *ferric* sulphate, by boiling with a little *deutoxyd of lead*; and the second is the *complete* precipitation of the ferric sulphate, by boiling with a little *carbonate of baryta*. The hot solution is then filtered and allowed to crystallize, when large crystals of beautiful form and

color are obtained, containing no trace of iron. Deutoxyd of lead is prepared for this purpose by boiling *minium* with dilute nitric or acetic acid in the usual way, but minium itself, if free from soluble impurities, may be used directly in ordinary cases, although a portion of the oxyde of copper also is thereby precipitated. *Deutoxyd of barium* is of course also applicable.

In cases where the presence of a little lime in the product is of no moment, as for the use of the calico-printer and manufacturer of pigments, carbonate of lime may be substituted for that of baryta.

In addition, it may be remarked that if the blue vitriol contains traces of *manganese*, as is extremely liable to occur, this contamination, as would appear from the observations of Schönbein and Wolcott Gibbs, must also be entirely removed.

The same treatment is evidently applicable to some other sulphates, and I therefore present it as a general method for the removal of iron from the sulphates of bases precipitated with difficulty by carbonate of baryta, namely, those of *the alkalies, magnesia, manganese, zinc, cadmium, mercury, nickel, cobalt and protoxyd of iron.* Of these the most important one practically is the sulphate of magnesia. The mode of proceeding with this would be precisely similar to that with the copper salt, as it would be also with the sulphates of zinc, cadmium, mercury, nickel and the alkalies. With regard to the manganous sulphate it must be remembered that deutoxyd of lead, as observed by Schönbein, wholly precipitates sulphate of manganese from its boiling solution; so that the deutoxyd must be used only in small excess over the necessary quantity. The same precaution applies, in a modified manner, to the treatment of the cobaltous sulphate, because Gibbs states that the salts of this metal are also partially precipitated by long boiling with an excess of the deutoxyd, passing first to a higher state of oxydation.

As to the protosulphate of iron, I have already (New York Jour. Pharmacy, i. 229) recommended the use of carbonate of baryta for the removal from it of sesquioxyd of iron. In the same paper (which has, I believe, entirely escaped notice from other Journals, owing to the irregularity with which the *exchanges* of that publication were effected) I have given, among other observations upon the purification of copperas, another

method of obtaining its solution free from ferric sulphate, namely, by acidulation with sulphuric acid and agitation with a little pulverized *protosulphid of iron*, by which the sesquioxyd is immediately reduced to protoxyd.

To return again to the sulphate of magnesia, before leaving the subject, I must add that the treatment with carbonate of baryta, according to a former observation of my own, must remove also entirely the *sulphate of lime* which usually contaminates commercial Epsom salts; for, as I have there stated, carbonate of baryta totally precipitates gypsum from its solution, even in the cold; and I have there proposed it as a means of removing the gypsum from spring or sea water which is to be used in steam boilers, (thus preventing *incrustations*,) as well as from the salt works. I have since found that *carbonate of lead* has the same power of precipitating gypsum, and may possibly be a cheaper agent for the purpose than carbonate of baryta, considering the facility with which the lead may be *recovered* from the resulting mixture of sulphate of lead and carbonate of lime, in a metallic form.—*Am. Jour. Science and Arts, Nov.* 1858.

ALUM IN CHINA.

By Dr. Macgowan.

About eleven hundred tons of alum have been exported within a short period, chiefly to India. This mineral is largely employed by the Chinese in dyeing, and to some extent in paper-making as with us. Surgeons apply it variously after depriving it of its water of crystallization, and in domestic life it is used for precipitating vegetable substances suspended in potable water. It is used also by the Chinese in a manner peculiar to themselves. Fishermen are usually provided with it, and when they take one of those huge Thizostoma which abound on the coast, they rub the animal with the pulverized stypic to give a degree of coherence to the gelatinous mass. Architects employ it as a cement in those airy bridges which span the watercourses. It is poured in a molten state into the interstices of the stones; and in structures not exposed to constant moisture the cohesion is perfect, but in damp situations it becomes a hydrate and crumbles, a fact of which the whole empire was officially informed by the government about thirty years ago. It was discovered that

water had percolated into the mausoleum of Kiaking; having been built too near to the mountain side, the alum cement imbibed moisture, segregated, and opened the way for it to enter the tomb. In those peaceful days such an event was of so great importance as to call forth edicts and rescripts, memorials and reports in succession for several months. The son-in-law of the deceased monarch, to whose care the construction of the edifice had been entrusted, was fined and degraded, and a statesman from Fohkien, acquainted with the properties of alum, was appointed to remove it a short distance from the mountain.

Alum was first introduced into China from the west, and until a comparatively recent period the best kind, called sometimes Persian, and at others, Roman Alum, was brought from Western Asia. Numerous localities where an inferior article is manufactured, are mentioned in the Pharmacopœia—*viz*; Shan-tung, Shan-see, Kiang-su, Hu-kwang, Sz'-cheun, and also in the south western frontier and in Thibet. That from Sz'cheun, is represented as having the property of converting iron into copper, or of coating iron with copper, by placing the former metal in a solution of rice-liquor, and alum the stone of that province. The most recent editions of works of materia medica contain no reference to the mines in this province, the products of which have surpassed in quality the foreign, and rendered its importation unnecessary. From this and from other circumstances, it is certain that the works which we shall now describe have not been long in operation. They are in the Sung-yang hills bordering on Foh-kien in the district of Ping-yang, Wan-chau prefecture, and in close proximity to Peh-kwan harbor (27° 9′ 10″ N., 120° 32′ 6″ E.)

The locality has been visited by one foreigner only, to whom we are indebted for the following particulars. About two months ago he started from Chi-k'i bight in Lannai harbor, to which Ningpo boats resort for this commodity, to the northward of Peh-kwan. Three hour's hard walking over a succession of precipitous hills crossed by stone steps and pathways brought him to the mines. Ten alum-making establishments were in operation, which, with the exception of one on a hill opposite, occupied about a mile of the side of a lofty hill. The works

were adjacent to the quarries from which the alum-stone seemed to crop out of decomposed rock of the same lithological character. The stones were thrown into a fire of brushwood, where they were burnt with a slight lambent flame, and as they cracked, the fragments were raked out, broken into small pieces, and macerated in vats. Subsequently the disintegrated mineral was thrown with water into a vessel having an iron bottom and sides of wood, and boiled for a short time. The lixivium was then poured into large reservoirs, where it crystallized into a solid mass. Blocks of alum, weighing about fifty catties each, were hewn out of the reservoir and carried in this state in bamboo frames, one on each end of a porter's pole to the place of shipment, where it is broken into fragments. When not designed for immediate exportation the blocks are stored away for drying. On reaching the depot the alum is found charged with a double quantity of moisture ; the porters being obliged to deliver a certain weight, they slip their burdens in the mountain streams which they pass in the journey.

Judging from the number of laborers engaged in transporting the mineral on the day of our informant's visit, the quantity brought from the works could not be less than eighteen tons. This was represented as less than an average day's work, as labor was in such demand just then for agricultural purposes, that double pay was given ;—and aged men, and women, with boys and girls were pressed into the service. Assuming that day's product as a basis for calculation, and making an allowance for rainy days, we may safely estimate the annual supply as between five and six thousand tons. The quantity consumed by the dyers of Ningpo prefecture alone, being nearly twenty-two tons per annum is corroborative of this estimate. The supply is literally inexhaustible. Five dollars and a quarter a ton at the landing would afford the manufacturer a fair profit. It often fetches much more, as there has been an increasing demand for the article, owing to the greater facilities afforded for exportation from Ningpo in foreign vessels.—*American Journal of Science and Arts, November*, 1858.

NEW RESEARCHES ON ALCOHOLIC FERMENTATION.

By M. L. Pasteur.

Contrary to the opinion generally held, I am able to affirm that not the smallest quantity of lactic acid is found in alcoholic fermentation; and whenever this acid is found, two very distinct fermentations are accomplished simultaneously. Alcoholic fermentation is accompanied by lactic acid only in rare and exceptional circumstances, and when peculiar conditions, susceptible of being reproduced at pleasure, gave rise to the yeast which I have made known as lactic yeast.

This new yeast being formed of much smaller globules than that of beer yeast, it is easy to ascertain by means of the microscope, if there is a mixture of the two yeasts, and thus to anticipate the presence or absence of lactic acid.

One question naturally presents itself: we have known, from the time of Lavoisier, that, in alcoholic fermentation, the liquor always assumes an acid reaction. If lactic acid is found exceptionally by the means which I have just pointed out, what is the cause of the acidity of the liquor?

Numerous experiments have enabled me to ascertain that it is to succinic acid alone that the acidity of the liquor in alcoholic fermentation is due. The presence of this acid is not accidental, but constant, and with the exception of the volatile acids which are formed in infinitely small quantities, it may be said that succinic acid is the only normal acid of alcoholic fermentation. In whatever conditions I have hitherto operated, I have found succinic acid and glycerin, as uniformly as carbonic acid and alcohol, as regards their existence as products of alcoholic fermentation.

The immediate consequences of these results will be comprehended by every one. But I must be more reserved than any one in their discussion.—*London Chemist, Oct.* 1858, from *Comptes Rendus*, August 2, 1858.

ON THE CAMPHENIC SERIES.

By M. Berthelot.

The relations which exist between the formula of the camphor of Borneo, or camphol, $C^{20}H^{18}O^2$, that of ordinary camphor $C^{20}H^{16}O^2$, and that of the insomeric carburets, $C^{20}H^{16}$, and the artificial formation of ordinary camphor by means of Borneo camphor realised by M. Pelouze, have led me to try the inverse experiments, and to form these substances with each other. I have followed up this attempt not in relying on approximations of formulæ, which are too frequently fruitless, but on considerations relative to the similitude of molecular states.

Indeed, if camphol and ordinary camphor are comparable as regards their physical properties, it is not the same with the carburets, $C^{20}H^{16}$. None of these bodies at present known effects the solid state or the physical properties so characteristic of camphors. But several of these carburets, if not all, and especially essence of turpentine, may form a crystallised hydrochlorate, $C^{20}H^{16}HCl$, endowed with the general properties of the camphors, and often designated, on account of this fact, by the improper denomination of artificial camphor. It is this hydrochlorate which I have taken as a starting point. Although my researches are not yet concluded, I have already obtained a certain number of results, which I think useful to indicate briefly.

I have decomposed the solid hydrochlorate $C^{20}H^{16}HCl$ in special and proper conditions for preventing all molecular modifications, which had not hitherto been done, and I obtained a carburet of hydrogen of the formula $C^{20}H^{16}$, endowed with the rotatory power, volatile towards 160° C. (320° F.), crystallisable and fusible at 46° C. (114° 8′ F.) quite similar to the camphors properly so called: this was true *camphene*. Hydrochloric acid changes it entirely into solid hydrochlorate.

This camphene, oxidised under the influence of platinum black, is metamorphosed into a volatile and crystalline matter, with the odor and appearance of ordinary camphor, and probably identical with it; I have not yet completed the study of it.

Finally, ordinary camphor, $C^{20}H^{16}O2$, was heated between 180° and 200° C. (356° and 392° F.) with an alcoholic solution

of soda, conformably to M. Cannizaro's method of converting the aldehydes into alcohols. It furnished camphol, $C^{20}H^{18}O2$.

The following is the way in which I isolated this last substance. After having opened the tubes in which the reaction was operated, I precipitated with water* the camphory matter. I compressed it, purified it by sublimation, then heated it to 200° C. (302° F.) with stearic acid. In these conditions ordinary camphor does not form a neutral combination in appreciable proportion, whilst camphol forms a great quantity of stearic camphol, which is easily isolated and purified. The body thus prepared possesses the normal composition of $C^{56}H^{52}O^4$. Decomposed by soda lime at 120° C. (248° F.) it readily regenerates camphol, $C^{20}H^{18}O^2$, with its composition and its most essential physical properties. The camphol thus regenerated contains :—

C = 77·6
H = 11·8

The formula $C^{20}H^{18}O^2$, requires :—

C = 77·9
H = 11·7

These results, which it is necessary to complete by the study of the rotatory powers and by that of the product of the oxidation of camphene, will establish between the various camphors and the natural carburets of hydrogen a collection of experimental relations founded essentially on the comparative study of the corresponding molecular states.—*Chemist, from Comptes Rendus*, August 6, 1858.

ON HAUTLÉ, OR ANIMAL BREAD OF THE MEXICANS,

By M. Guerin-Meneville.

In the *Bulletin de la Société Impériale Zoologique d'Acclimation*, M. Guerin-Méneville has published a very interesting paper on a sort of bread which the Mexicans call Hautlé, and which is made of the eggs of three species of hemipterous insects belonging to the group of water-bugs.

* Water retains in solution the soda salt of a peculiar acid, camphic acid, $C^{20}H^{16}O4I$.

According to M. Craveri, by whom some of the Mexican bread, and of the insects yielding it, were brought to Europe, these insects and their eggs are very common in the fresh waters of the lagunes of Mexico. The natives cultivate in the lagune of Chalco, a sort of *carex* called *toulé*, on which the insects readily deposit their eggs. Numerous bundles of these plants are made, which are taken to a lagune, the *Tescuco*, where they float in great numbers on the water. The insects soon come and deposit their eggs on the plants, and in about a month the bundles are removed from the water, dried, and then beaten over a large cloth to separate the myriads of eggs with which the insects had covered them. Those eggs are then cleaned and sifted, put in sacks like flour, and sold to the people for making a sort of cake or biscuit, called *hautlé*, which forms a tolerably good food, but has a fleshy taste, and is slightly acid. The bundles of carex are replaced in the lake and afford a fresh supply of eggs, which process may be repeated for an indefinite number of times.

Moreover, says M. Craveri, the Mexicans collect quantities of these insects from the surface of the water by means of hooped nets, and these are dried and sold as food for birds. In Mexico, these dried insects are sold in the streets and markets, the dealers crying "*Moschitos, Moschitos,*" just as in Europe they cry "*Food for your singing birds.*"

It appears that these insects have been used from an early period, for Thomas Gage, a religionist, who sailed to Mexico in 1625, says, in speaking of articles sold in the markets, that they had cakes made of a sort of scum collected from the lakes of Mexico, and that this was also sold in other towns.

Brantz Mayer, in his work on Mexico (*Mexico as it Was and as it Is*, 1844), says, "On the lake of Tescuco, I saw men occupied in collecting the eggs of flies from the surface of plants and cloths arranged in long rows as places of resort for the insects. These eggs, called *Agayacath*, formed a favorite food of the Indians long before the conquest, and when made into cakes resemble the roe of fish, having a similar taste and appearance. After the use of frogs in France, and birds' nests in China, I think these eggs may be considered a delicacy, and

I found that they are not rejected from the tables of the fashionable inhabitants of the capital."

The more recent observation of Messrs. Saussure, Sallé, Valet D'Aoust, &c., have confirmed the facts already stated, at least in the most essential particulars.

The insects which principally produce this animal farina of Mexico, are two species of the genus *Corixa* of Geoffroy, hemipterous insects of the family of water-bugs. One of these species has been described by M. Guerin-Méneville as new, and has been named by him *Corixa fermorata.* The other, identified in 1831 by Thomas Say, as one of those sold in the market at Mexico, bears the name of *Corixa mercenaria.*

The eggs of these two species are attached in innumerable quantities to the triangular leaves of the carex forming the bundles which are deposited in the water. They are of an oval form, with a protuberance at one end and a pedicle at the other extremity, by means of which they are fixed to a small round disc, which the mother cements to the leaf.

Among these eggs, which are grouped closely together, and sometimes fixed one over another, there are found others, which are larger, of a long and cylindrical form, and which are fixed to the same leaves. These belong to another larger insect, a species of *Notonecta,* which M. Guerin-Méneville has named *Notonecta unifasciata.—London Pharm. Journ., Sept.,* 1858, *from Journal de Pharmacie.*

ON THE AMOUNTS OF SULPHURETTED HYDROGEN AND HYDROCYANIC ACID IN TOBACCO SMOKE.

By A. Vogel, Jun. and C. Reischauer.

If tobacco smoke be passed through an alcoholic solution of neutral or basic acetate of lead, the incurrent tube soon becomes blackened in a remarkable manner, whilst in the fluid itself a precipitate of carbonate of lead rendered brown by sulphuret of lead is deposited. To obtain the sulphuret of lead uncontaminated with carbonate of lead in the following quantitative investigations, the tobacco smoke was passed through an alcoholic solution of acetate of lead strongly acidified with acid. The

precipitate of sulphuret of lead was dried and weighed, after washing with alcohol.

1. Turkish tobacco, 3·4 grms. gave 7 milligrms. of sulphuret of lead.
2. " " 3·7 " " 7·5 " " "
3. German cigars, 3 " " 9 " " "

Hence the presence of sulphuretted hydrogen in tobacco smoke is unmistakably proved. The presence of sulphuretted hydrogen in tobacco smoke may, however, be proved in a still more simple manner, by blowing the smoke through the cigar upon a piece of paper moistened with acetate of lead, when a brown color is immediately produced on the spot touched by the smoke.

The well-known reaction of sulphuretted hydrogen upon nitroprusside of sodium is exhibited most characteristically when a few drops of a solution of that salt mixed with ammonia are put into a test-tube and the tobacco smoke is introduced by a tube, which does not reach quite to the bottom of the test-tube. The walls of the glass moistened with the solution of nitroprusside of sodium, by shaking acquire a deep violet-red color by the action of the sulphuretted hydrogen of the tobacco smoke. The above data show at the same time what influence the incineration of the parts of plants must have upon the accuracy of the determination of the sulphuric acid in the ashes.

In order to determine directly the loss of sulphuric acid in the ashes caused by the incineration, the amount of sulphuric acid in the tobacco ashes produced in experiment 1 was ascertained. From this it appeared that of 100 parts of sulphuric acid in the tobacco, 12·63 were evolved in the smoke in the form of sulphuretted hydrogen. This circumstance is consequently of importance in the determination of the sulphuric acid in incinerated parts of plants, and the more as a portion of the sulphuretted hydrogen also escapes observation in the upper part of the smoke of the burning tobacco.

After cyanogen compounds had been sought in vain, even in large quantities of the ashes of tobacco, the tobacco smoke itself was examined for cyanogen. The method of detecting hydrocyanic acid in the smoke is as follows:—Tobacco smoke is passed through a concentrated solution of caustic potash. The solution by this means acquires a slight brownish color, and when a turbidity is produced by dilution with water, it must be

filtered. The solution is then mixed with protopersulphate of iron and heated. It is necessary to employ a spacious vessel for this purpose, as a strong evolution of carbonic acid takes place, especially at the boiling-point. The precipitate obtained is treated with an excess of chemically pure muriatic acid, when the precipitated oxide of iron is dissolved, leaving behind it Prussian blue.

The separation of the Prussian blue is facilitated by heating the solution; after filtration and complete washing with hot water, and afterwards with alcohol, it usually remains upon the filter of a dark blue color. If, however, it be of a dingy green color from the presence of empyreumatic constituents of the tobacco smoke, it must be freed from this impurity by agitation with ether and alcohol, when it always remains with its characteristic color.

It is obtained most beautiful, when, after it has been washed as much as possible upon the filter, it is decomposed by solution of potash, and a protopersalt of iron is added to the solution filtered from the peroxide of iron, by which it is regenerated, freed from foreign intermixtures, after treatment with muriatic acid.

Two cigars, weighing together 10·6 grms., furnished 0·018 of Prussian blue; and two cigars of another kind, weighing together 8·5 grms., gave 0·010 of Prussian blue.

Amongst all the samples of tobacco investigated in the above manner by the authors, there was only one which gave an imponderable trace of Prussian blue from 5 grms. This was a very old tobacco. All the rest distinctly showed the presence of Prussian blue. The mode of smoking tobacco, whether in the form of a cigar or in a pipe, in fact, the mode of combustion in general, appears to have an influence upon the formation of hydrocyanic acid in the smoke.—*Chem. Gaz., Oct.* 1858, *from Dingler's Polyt. Journal.*

ON THE EMPLOYMENT OF PERMANGANATE OF POTASH AS AN OXIDIZING AGENT.

By S. Cloëz and E. Guignet.

To determine the sulphur contained in a sulphuretted material, the most exact process consists in converting the sulphur

into sulphuric acid, which is then precipitated by a soluble salt of baryta. Nitric acid is usually employed for the oxidation of the sulphur, but its action is slow and difficult. It only becomes complete by long boiling with concentrated nitric acid, and in operating upon sulphuretted organic matters, we have to fear either an imperfect oxidation or a loss of sulphuric acid by volatilization. The action of nitric acid is therefore often replaced by that of a mixture of nitrate of potash and an alkaline carbonate in fusion, into which the matter to be analysed is thrown in small portions. This process is inconvenient in operating upon gunpowder, which must be mixed with several times its weight of chloride of sodium, in order to moderate the reaction.

The authors propose to effect the conversion of sulphur into sulphuric acid by means of permanganate of potash. For this purpose crystallized permanganate, containing no appreciable traces of sulphate, must be employed. To ascertain that the salt contains no sulphate of potash, a small quantity may be boiled with pure muriatic acid until it is completely decomposed; the liquid should not precipitate chloride of barium.

The operation is performed as follows, taking gunpowder as an example of the material to be analysed:—About 1 grm. of powder is weighed very accurately, and dried in a stove or a current of dry air at 112° F. until it no longer loses its weight; in this way the quantity of water is determined. The dried material is then put into a small glass matrass with a saturated solution of permanganate of potash; and the liquid is boiled, with the addition of permanganate from time to time, until the mixture has a persistent violet tint.

All the sulphur in the powder is then converted into sulphuric acid, and the carbon into carbonic acid; the liquid holds oxide of manganese in suspension; concentrated muriatic acid is added, and the whole is boiled until the oxide is completely dissolved, which only requires a few minutes. If the solution of the oxide be slow, the liquid is too dilute, and must be concentrated by evaporation; after which pure muriatic acid is again added; a slight excess of chloride of barium is then poured into the balloon, so as to precipitate all the sulphuric acid, a little nitric acid is added, and the whole is boiled so as to give co-

herence to the precipitate of sulphate of baryta. The latter is then washed with distilled water on the filter until the washing-water produces no turbidity in nitrate of silver. The filter is calcined with its contents in a platinum capsule, and weighed, deducting the weight of the ashes of the filter in the ordinary way.

In a laboratory where numerous determinations of sulphur have to be made daily, instead of collecting and weighing the sulphate of baryta, the liquid might be precipitated by a normal solution of chloride of barium by the *method of successive approximations*. The results are very exact, and the whole operation does not last more than a quarter of an hour.

The finely divided carbon contained in powder being readily and completely oxidized by permanganate of potash, the authors think it possible that this reagent may be applied to the determination of the carbon contained in animal charcoal, or in other matters containing finely divided carbon.

The analysis of the saline compounds of sulphur is very easily effected by permanganate of potash. Hyposulphite of soda reduces the solution of permanganate immediately in the cold, and by adopting the same course as with gunpowder, the authors obtained the following results:—1·000 gr. of commercial crystallized hyposulphite of soda gave 1·850 gr. of sulphate of baryta, containing 0·254 gr. of sulphur. Calculation from the formula S^2O^2, NaO, 5HO requires 0·258 gr.

The authors have ascertained that this method does not apply only to bodies which attract oxygen with avidity, but that the most stable sulphuretted compounds are completely oxidized by permanganate of potash, the sulphur being entirely converted into sulphuric acid; thus sulphuret of carbon, which resists ebullition with fuming nitric acid, and dissolves hyponitric acid without being decomposed, becomes completely changed into sulphate of potash and carbonic acid when boiled with a solution of permanganate of potash.

Different organic sulphuretted compounds, especially hydrosulphate of sulphuret of benzyole, behave in the same way. The authors therefore hope that this method will advantageously replace the oxidation of sulphuretted matters by the mixture of

carbonate of soda and chlorate of potash, or by oxide of copper in a current of oxygen.

For certain sulphuretted compounds the employment of the permanganate presents peculiar advantages. In the analysis of the alkaline polysulphurets and hydrosulphates there is never any fear of loss of sulphur by evolution of hydrosulphuric acid, as the liquid is constantly alkaline.

In the course of their experiments the authors have observed some facts regarding the action of permanganate of potash upon various organic matters. The hydrocarbons of a low equivalent, such as benzine, reduce the permanganate in the cold with great facility, only furnishing carbonate or bicarbonate of potash. But the higher hydrocarbons furnish, together with the carbonate, some well-defined products of oxidation. Thus naphthaline furnishes naphthalic acid, a product which is difficult to prepare by the methods hitherto known.

Camphor reduces the permanganate by the aid of a prolonged ebullition; camphorate of potash is formed.

Alcohol does not act very speedily upon the solid, pulverized permanganate, in consequence of the slight solubility of this salt in alcohol; acetate of potash is produced. Under the same circumstances wood-spirit furnishes carbonate and formiate. Sebacic acid is converted into succinate of potash.

Stearic acid only gives a mixture of stearate and carbonate; benzoic acid has an analogous action, a portion of it forming benzoate of potash, whilst the rest is completely oxidized, forming water and carbonic acid.

Aniline reduces the solution of the permanganate in the cold; oxalate and carbonate of potash are formed.

Lastly, ammonia decomposes the solution of the reagent in the cold, nitrogen being evolved. No nitrate is formed.—*Chem. Gaz.*, *Oct.* 15, 1858, *from Comptes Rendus*, *June* 7, 1858.

Varieties.

Binocular Vision.—Of the thousands who gaze with delight upon the magical effects produced by that small instrument known as the stereoscope, how few there are who comprehend, or attempt to assign reasons for, the extraordinary optical illusions experienced through its instrumentality.

It is with the view of, in some degree, elucidating the principles of vision upon which these are founded, that the following article is written.

It will in the first place be well to consider the difference between monocular and binocular vision. Nature has furnished us with several means of determining the distance of objects which may happen to come within reach of our visual organs. One is that of distinctness; a greater or less degree of which—other things being equal—gives an idea of greater or lesser distance in the object viewed. The second is through the change of focus required in the lens of the eye in refracting to a point on the retina, rays of light entering it with a greater or lesser degree of parallelism, thus producing in the brain a consciousness of unequal distances in the objects from which they emanate.

The means above alluded to, it is evident, are enjoyed in almost the same degree, when viewing with one eye as where both are used.

By far, however, the greatest power with which nature has endowed us of discriminating distances, is through the agency of binocular vision; or in other words, in the sensation produced in the brain by the different degrees of convergency of the optic axes required in obtaining distinct vision of the differently distant points of objects upon which they are directed. It is to this faculty that we are indebted for our most palpable evidence of differential distances, and for that consciousness of solidity and relief so remarkably experienced in the stereoscope.

It is evident, for example, when we are looking at a house or other object that has depth as well as breadth, from such a point of view as to enable us to see two sides of it at once, that we receive a differently perspective image upon the retina of either eye, or that we must see more of one side and less of the other with the right eye than with the left, or vice versa. Thus accomplishing with one view what a person with but one eye would require two views at positions two and a half inches apart—the distance between the eyes—to accomplish. These are the different perspective views of the stereoscopic cards, and it is the effort to reconcile these dissimilar pictures by converging the optic axes at points differently distant from the eyes which produces the wonderful effects above alluded to,

and which enables us to experience all the sensations of delight which would be produced by the contemplation of the landscape itself.

The stereoscopic pictures will of course never quite correspond. They are taken simultaneously with a camera constructed with two lenses, or consecutively with a camera with one movable lens.

The lenses of the stereoscope, besides magnifying the pictures, are so placed as to unite certain similar points of them, thus relieving the eyes of too great effort by uniting them entirely by convergency of the axes.

The means above alluded to, by which we are enabled to judge of differential distances, are of course much diminished by the distance that the objects viewed are removed from us.

Our consciousness of different distances by distinctness is diminished through decrease of light.

Our judgment, through change of focus, is diminished in consequence of the parallelism of rays from distant objects being so nearly the same as to require but little change in refracting them to a point on the retina. And lastly, the binocular effect is in a great degree impaired through the identity of distant views when seen from positions only separated by a base of two and a half inches.

Nature has thus observed her usual economy in providing for our necessities alone. It being of little comparative importance to us generally, to be acquainted with the relative positions of distant objects, whereas our personal convenience and even safety depend greatly on our knowledge of those near at hand. We are therefore provided with much more ample means of determining the latter than the former.

It may not be out of place here to allude to another subject immediately connected with vision.

Sir David Brewster says, in allusion to the cause of erect vision from an inverted image, "That it has long been a problem among the learned." And further remarks, "That it is perfectly explained by the law of visible direction." Now, although it is evidently a consequence of that law, the question arises, why should we see objects in a direction perpendicular to the retina at the point where their image meets it?

In truth, it is one of those facts that requires no explanation, as there is nothing inconsistent or irrational in it.

There is no more reason that an inverted image should give us the idea of an inverted object, than that the reverse should be the case, or that it should give the idea of a horizontal one. There is no unity necessary between the direction of an object and the direction of its image upon the retina. Nature has so associated impressions upon the retina with impressions on the brain, that an inverted image on the former is evidence of an erect object to the latter. And we have no consciousness of anything to the contrary.—*Jour. Frank. Ins. Dec.* 1858. W.

Minutes of the Pharmaceutical Meetings.

Eleventh month 9th, 1858.

At a Pharmaceutical Meeting of the Philadelphia College of Pharmacy, donations to the Cabinet were presented by Dr. Bridges, in the name of Mr. Robinson, of Newport, being specimens of Chinese dyes, one known as Henny Lok, the other used to change the blue color produced by the first to a green.

S. S. Garrigues presented specimens of genuine Sumatra Camphor, known also as Borneo Camphor, (Dryobalanops Camphora, Colebr.) This camphor is obtained in small masses from the longitudinal cavities of the trees, and commands in the Chinese market from twenty to forty dol-dollars per pound. Also a specimen of Liquid Socotrine Aloes from Daniel Hanbury, of London.

Prof. W. Procter, Jr., presented specimens of Fluid Extracts of Squills, Butternut, Calisaya Bark, Ipecac, Mandrake, Conium, &c., as prepared by H. Thayer, of Boston, also a specimen of White Huckleberry (Gaylussacia resinosa, Gray) from Huntington County, Pennsylvania; also a specimen of Kaolin from South Carolina.

Donations to the library were received from Wilson H. Pile.

W. Procter, Jr., presented a photographic view of the American Pharmaceutical Association, as taken during their late visit to the tomb of Washington at Mount Vernon.

Dr. Bridges exhibited a quantity of Sulphate of Magnesia, as obtained in the form of an inflorescence from the side of a flue, formed by the decomposition of the mortar, through the action of the acid fumes from the coal fires; it appears that a large portion of the limestone from the neighboring localities used for making the mortar, contain quite a considerable amount of magnesian ores, thus accounting for its presence in the wall.

Prof. Procter, Jr., then read some extracts from the proof sheets of a paper by S. M. Colcord, of Boston, "On the Professional Intercourse between Physicians and Pharmaceutists, which produced some general remarks from many of the members present; after which, adjourned.

S. S. Garrigues, *Sec.*

—

Twelfth month 7th, 1858.

Quite a large attendance of members and others interested in the progress of Pharmacy. E. S. Wayne, of Cincinnati, was introduced to the members present.

The committee on the library reported the following donations and deposits of books since the last Pharmaceutical Meeting.

From Edward Parrish, 7 volumes; Samuel F. Troth, 10 do.; Thomas P. James, 21 do.; Samuel N. James, 28 do.; Total 66.

Deposited by Samuel F. Troth, 19 volumes; Publication Committee, 6 do.; Total 25.

A copy of the Proceedings of the Seventh Annual Meeting of the American Pharmaceutical Association, was presented by S. S. Garrigues in the name of the Association.

Donations to the Cabinet.

From F. L. Johns, specimen of Chinese sac musk, the interior of this being nearly filled up with pieces of leather, lead, &c. In fact, the getting up of the sac was well calculated to deceive the best judges, and it has no doubt been prepared in China; also two varieties of Chinese fly (Mylabris cichorii.)

C. Bullock, presented a specimen of a cinchona bark from Prof. Aikin, of Baltimore, it having been found in an invoice of cinchona barks; on comparing it with a specimen in the College Cabinet, it proved to be Cinchona bicolorata.

William Procter, Jr., exhibited a specimen of the Botany Bay Kino, being the concrete juice of the Eucalyptus resinifera; also the juice of the same tree in a liquid form. These specimens are from S. W. Osgood, formerly of New York, now of Davenport, Iowa, and are described in a note to the Eleventh Edition of Wood and Bache's Dispensatory. According to Prof. Procter, it is entirely soluble in alcohol, and contains 67 per cent. of matter soluble in water.

E. Parrish exhibited quite a number of chemical and pharmaceutical products, such as pulverulent extract of Nux Vomica, Belladonna, &c., oil of cumin, oil of eggs, oil of European wormseed, (Artemisia Vahliana, Kost,) Quinium, Asparagin, Kamala (Rottlera tinctoria,) Oxalate of Cerium, and a superior article of genuine Elaterium made by Allen & Hanburys.

He also exhibited and explained the working of a neat French apparatus for making carbonic acid water in small quantities.

He also called attention to the metallic foil on the corks of Blanchard's pill bottles, used to prove the impervious coating of the pills. In a bottle in his possession, the coating being cracked, displayed the characteristic reaction of iodine on metallic surfaces. This fact appeared more important as disproving the asserted protection of the foil by a varnish, preventing its being attacked by the iodized vapor.

One of the firm of Z. Locke & Co. made an exhibition of the so called non-explosive burning fluid, showing that it is quite as explosive as the burning fluid made in the usual way. In his experiments before the meeting, the exhibitor expressed his opinion that the only protection against the explosions of burning fluid was to use the safety can, in which the openings were protected by wire gauze, thus preventing the flame from passing into the can.

E. S. Wayne being invited, exhibited some very interesting specimens of the products of distillation of cannel coal, as also that from the Seneca oil. All these oils are hydrocarbons, and are finding extensive use in the west for illuminating and lubricating purposes. The paraffine exhibited by him, as obtained from the same coal, was very fine, and it is supposed will at some future time take the place of white wax for many of the pharmaceutical purposes in which that article is now used. Paraffine is now being extensively employed, with the addition of a small per centage of stearin, in making candles. It specific gravity in a pure state is 0.850 to 0.890.

After various remarks from those present, then adjourned.

S. S. Garrigues, *Sec.*

Editorial Department.

Tilden & Co. and the Medical Journals.—There was a period within the recollection of many, when a large proportion of the vegetable extracts consumed in the United States were made with so little regard to the rules which should guide the manufacturer in their preparation, that they but illy represented, in many instances, the drugs from which they were prepared. About ten or twelve years ago, the Tildens, accidentally becoming possessed of the shop and material of a seceder from the Shaker community, at New Lebanon, N. Y., after considering what was the best disposition to make of it, determined to continue the business of cultivating medicinal plants for the supply of pharmaceutists and druggists, and preparing vegetable extracts from the same. They soon saw the advantages that would arise to the medical profession, and consequently to their firm, if, for the crude processes then employed by the Shakers, they could substitute the vacuum pan, and after considerable outlay and exertions, succeeded in producing extracts by this process greatly superior to those by the old process. The example thus set by T. & Co. was soon followed by the Shakers and others, and there is no doubt at all that the general character of this class of preparations is much better than it was fifteen years ago, largely through their agency.

The enterprise of Messrs. Tilden did not find sufficient scope to satisfy it in the class of preparations to which we have alluded. Fluid extracts coming into use, they seized the idea of supplying these too, made by their vacuum apparatus, and have manufactured them in great variety. Here has been one source of trouble. The indiscriminate application of a particular process to a great variety of drugs of varied constitution, requires an intimate acquaintance with the constituents of these drugs, and their relation to menstrua and preservative agents, so as not only to extract the

drugs effectually, but to preserve the important active ingredients in solution with the least possible tendency to change in keeping, by variation in season and climate. Some of the preparations of Tilden & Co., who chiefly employ sugar as an antiseptic for these fluid extracts, have, it appears, proved unequal to resist the unfavorable influence of tropical heat, and the editors of the "New Orleans News and Hospital Gazette," having become cognizant of some of these, have commented on them with more severity than justice, more bitterness than truth.

Urged on by the ambition of enterprize, this house, having earned a character for good preparations, determined to enlarge yet more the scope of its productions; not satisfied with getting a large share of the business of making extracts for the supply of pharmaceutists, they go further, and claim to divide these extracts into doses, and sugar-coat them, thus stripping from the business of pharmacy one of its most legitimate functions. It is the misfortune of such enterprizes that they cannot remain stationary. They must retrograde or advance by an increasing production of novelties; more and more complex and unwieldy becomes the machinery of business, till some of its distant movements get clogged by accidents flowing from its complexity. Such has been the experience of the Messrs. Tilden. An accidental substitution of pills containing tartar emetic for Plummer's pills, having occasioned some inconvenience to a patient, it was followed by an analysis and exposure. This house admits its custom of making up special formulæ, varying from officinal usage, to meet special demands, and in this instance some of the modified Plummer's pills containing an equivalent of tartar emetic became accidentally substituted for true Plummer's pills. This result should be a lesson and caution to all such manufacturers to confine their operations to legimate channels. The New Orleans editor, and some others who have commented on the operations of this house, have taken special offence at their announcement of an improved compound cathartic pill *without calomel*. The compound cathartic pill is strictly an officinal preparation. Without calomel it ceases to be "the compound cathartic pill," and Tilden & Co. have no just right to assume the name of this valuable preparation to get into use a substitute, when it must be apparent to every one who reflects, that it tends to sanction that strong prejudice that exists throughout sections of this country against mercurial preparations, and especially among the numerous botanic and Eclectic doctors and their patrons. If the legitimate demand of their commerce requires the production of such a pill, let them supply it, but give it a proper name. If there is any manufacturing house in this country which owes its success to the countenance of the medical profession, it is Tilden & Co.; though to their own enterprize in bringing their preparations to the notice of physicians, this recognition is mainly due; hence none should be more conscientiously careful to keep to the well defined path of pharmaceutical rectitude in making their products. We wonder that

they should be willing to run the risk incurred by engaging in so many petty items, when the regularly recognized preparations of the Pharmacopœia and dispensatories afford them so wide a scope. They have had, and still have, an admirable opportunity to take a firm and unflinching stand in upholding the purity and perfection of pharmaceutical products and manipulations, and on their true assumption of this position will depend their future success.

There is one point on which we feel called to offer a caution. It is this: although unjust censure will not destroy the virtue of good extracts, no amount of praise or of puffing will make bad preparations good; nor will it prevent their ultimate condemnation by physicians, though it may retard the discovery. Tilden & Company have had the confidence of the medical and pharmaceutical professions to a degree that it merits their utmost endeavors to retain. Let them keep to the strict letter of pharmaceutical authority in their manufactures. Let them refuse to issue imperfect preparations under any pretence of use for special applications. Let them give more attention to the manipulation of their laboratory, and less to the influence of *the press*, and their house will possess a basis of excellence so broad and pyramidal, that editorial censures will prove as harmless as they are undeserved.

Proceedings of the American Pharmaceutical Association at the Seventh Annual Meeting, held in Washington, D. C., September, 1858, *with the Constitution and list of members.* Philadelphia, 1858, pp. 488 octavo.

The Executive Committee have, after much expenditure of labor, owing to the imperfections of several of the MSS. submitted to them, issued the volume of "Proceedings." As a whole, with a proper allowance for the circumstances under which it was produced, it is a production creditable to the Association and to the Executive Committee. We propose to give a sketchy outline of the papers it includes. These are divided into two sections, 1st. Reports of Committees, 2d. Scientific Reports and Essays; premising that the record of minutes is nearly the same as that already published in the November number of this Journal.

The Report on the Progress of Pharmacy, by Frederick Stearns, occupies fifty-two pages and embraces a bird's-eye view of the leading observations and discoveries in chemistry, organic and inorganic, having a pharmaceutical bearing, Practical Pharmacy, Materia Medica, Toxicology, Pharmaceutical Institutions, and the Sale of Poisons. It concludes with a catalogue of the literary publications of the past year bearing on pharmacy, and a list of the quantities of Drugs imported into New York during 1858. The chief value of this Report will be as an index to the subjects investigated during the year, references being made to the journals.

The Syllabus of a Course of Study, intended as an aid to students of pharmacy, being a special report by Wm. Procter, Jr., occupies 66 pages, one-half

of which are in small type. It is well to state that the author of this report deemed the task so imperfectly accomplished, owing to the necessity of condensation to get it within reasonable limits, that he doubted the propriety of its publication by the Association, and suggested its reference to a committee. This committee reported in favor of its publication.

The report on the Revision of the U. S. Pharmacopœia occupies 44 pages, and is composed of sub-reports from Messrs. Carney, Meakim, Stearns, Melvin and Graham, which embrace many valuable suggestions that are now in a form to facilitate their study by all the revising committees who are, or will shortly be, appointed by various medical or pharmaceutical bodies. It will be well for apothecaries who feel an interest in the improvement of pharmaceutical processes to try many of these suggestions, and give, either through the journals or to the committee appointed to revise these reports, the results of their examination.

The report on Home Adulterations, by Prof. Guthrie, was noticed in our last number. "That on Local Unofficinal Formulæ" is brief compared with the report of last year.

The paper of Frederick Stearns on "the Medicinal Plants of Michigan," exhibits great industry on the part of the writer, and the great richness of the flora of Michigan. We have made a few extracts from this report, which will be found at page 28 of this number, on Abies canadensis, Carya amara, Gaultheria procumbens and Ulmus fulva.

The remarks of Prof. Grahame on Displacement embrace several suggestions meriting attention and will be read with profit. The next paper, on Tobacco, has already been published in our last.

The paper on Blue Mass, by Charles Bullock, is particularly worthy of attention, and developes some results in reference to the solubility of mercurial compounds not generally understood.

E. Dupuy's paper on Saccharides will be found interesting; and that on Podophyllin, by Dr. Stabler, is in our last number. The next, an Essay on Wild Cherry bark tree, by Wm. Procter, Jr., gives a general history of the preparations derived from that tree, with some suggestions on the use of the distilled water of the leaves in lieu of the Cherry Laurel water imported from Europe. Dr. Donnelly's paper on the Brazil nut tree [Bertholletia excelsa] and its products, is accompanied by a beautifully executed lithograph engraving of the fruit and leaf copied from an oil painting accompanying the report. Dr. Battey's report on Southern Arrow Root is also illustrated by an engraving of the machine used in rasping the root. It consists chiefly of the results of Messrs. Cooper and Hallowes, which show that no obstacle exists to the abundant production of arrowroot in Georgia, the culture of the plant being nearly that of the sweet potato.

The paper of John M. Maisch, on the Detection of Adulterations of Volatile oils, is a valuable contribution to practical pharmacy, and deserves careful perusal. It brings together all that is known on this difficult sub-

ject, and embraces many useful suggestions regarding the application of the tests, especially Heppe's test with nitro prusside of copper. We hope to be able to publish this paper in a future number.

The paper on "Professional Intercourse between the Apothecary and physician," by Samuel M. Colcord, discusses a matter interesting to every dispensing pharmaceutist. The writer is entirely candid in the discussion, and handles some features of the subject without gloves. Its reading at the Association was the occasion of considerable discussion, which arose chiefly from the following paragraph:

"It is a fact well known to our profession, that to educate a competent dispenser, who can pass a good examination at our schools of pharmacy, requires more time, closer application, attentive study and better manipulation, than it does to acquire knowledge sufficient to obtain, in our medical schools, the degree of M. D., and it is almost an invariable rule that physicians who abandon the profession of medicine for that of pharmacy make the poorest apothecaries."

The consequences arising from carelessly written prescriptions are graphically portrayed, and the interference of physicians with the business of apothecaries. Mr. Colcord thinks that where errors occur in prescriptions the apothecary should return the recipe to the patient with his reasons for not dispensing it. We do not agree with the writer on this point. We believe it is the interest of the apothecary that all such errors should be kept from the knowledge of the patient, as not only destroying confidence in the prescriber, but as reacting against the apothecary by exciting suspicions and doubts in regard to other occasions.

In allusion to the habit of certain physicians interfering with the business of apothecaries by sending their patients to other stores, he justifies the physician when he *knows* that such apothecaries are incompetent, but deprecates such course when it is a mere whim.

"It is not uncommon or improper for a physician, on reasonable grounds, to recommend a change of apothecaries, and why should it under similar circumstances be considered wrong for apothecaries to advise a change of physicians? For I hold that apothecaries are as good judges of the professional qualifications of physicians, as physicians are of apothecaries. It has often happened to me, and I presume it has to many of our profession, that friends of the patient, in a state of great anxiety, have made earnest appeals to us for opinions as to the qualifications of their physician, and under circumstances when a direct answer could scarcely be avoided; and I hold that in such cases, when sure that our opinions are correctly formed, we are bound to give them to our customers, whether adverse or favorable to the physician; for in the one case greater confidence is placed in the treatment, which is always beneficial to the patient; and in the other, who of us have not known of rapid recovery occasioned by a change of medical adviser and treatment?

"We are not to suppose, because our intercourse with physicians presents so many objectionable features to us, that they have nothing to complain of in the management of our affairs, relating intimately or remotely to our intercourse with them. The statistics of our profession

would show plainly, that a majority of dispensers in this country are incompetent properly to perform the duties intrusted to them. For this reason we are accountable, in a great measure, for the degree of contempt heaped upon us by them. Were we to change places with them, we should hardly be willing to have our prescriptions compounded in the manner and of the materials that too often falls to the lot of theirs, even when the most common articles are prescribed. What well educated pharmacien, were he a physician, would be willing, on his prescription, to have the Spirit of Mindererus put up as frequently found in our stores, or the common article of cathartic pills, as found in many establishments considered quite respectable, or infusions made doubtful by using fluid extracts or concentrated tinctures to save trouble, instead of conforming to the officinal formula; or plasters and many other pharmaceutical preparations, from the laboratories of men of doubtful reputation, and which are known to be wanting in the qualities necessary to give them remedial value? Then again, knowing the ignorance and carelessness of a large portion of dispensers, who though they do not stand well in our profession, yet occupy responsible situations, what guarantee has the physician that his prescriptions, will not fall into the hands of those who are deficient in the knowledge and judgment sufficient to select articles of known purity, and who are incompetent to compound them so as to insure their greatest remedial power?

"It seems to me that the temptation is a very strong one, for a good physician to send his patients where he feels sure their wants will be properly supplied, even though he may pass by some equally deserving member of our profession, to the injury of his business. The only cause for censure that we can have, is when unfair means are used, or when the physician wilfully shuts his eyes to the qualifications of his nearest apothecary, for the benefit it may be of an acquaintance no better qualified.

"I must say, that were I a physician, I should be very careful into whose hands my prescriptions fell, and should feel it a sacred duty to my patients, to know who were, and who were not reliable. If physicians would take more pains to ascertain the qualifications of dispensers, it would soon make a manifest improvement in our profession, and in their success."

We would like to quote some other items, but our space does not permit. On the whole, we believe Mr. Colcord has spoken out many truths in an open manly way that will carry conviction with them, and though not pleasant to hear, will do more good than harm to both physicians and apothecaries.

The papers of T. P. James on the Culture of Liquorice, and F. Stearns on the Application of our Native Wines in Pharmacy, deserve attention. Of all the papers submitted to the Association, none were more practically useful and at this time available, than the excellent contribution of Dr. Edward R. Squibb, on the Processes of the U. S. Pharmacopœia needing Amendment, which occupies 44 pages in the proceedings. Our readers will find at page 49 an extensive quotation from this report. The remaining items are Dr. Guthrie on Indigenous plants, Dr. Thayer on Concentrated Medicines, Mr. Tilden on Medicinal Extracts, Mr. Merrill on Alcohol as a Solvent of medicinal matter and Mr. Stearns on the Peppermint Plantations of Michigan. The two last we have published entire in the preceding pages. The style of getting up this volume of Proceedings

is not only creditable to the liberality of the Association, but exhibits an amount of labor and attention on the part of the Executive Committee that merits the warm approval of the members.

An Inaugural Dissertation on Strychnia:—presented to the Medical Faculty of McGill College, May 1st, 1858, prior to receiving the degree of Doctor in Medicine and Surgery. By ALEXANDER P. REID. Montreal: 1858. pp. 39, octavo.

The author of this Essay appears to have given a careful study to the important subject which he treats, and goes over the whole ground of its history, preparation, characters, tests, physiological effects on vegetables and animals, post mortem appearances, uses, administration, and antidotes. About a third of the work is devoted to the *salts* of strychnia. The account of these is very detailed, and includes thirty distinct compounds. The author found iodureted iodide of potassium the most sensitive test for strychnia, producing in solutions of strychnia a very insoluble precipitate, to which he gives the name "Iodureted Hydriodate of Strychnia." We should like to make a number of extracts from this Essay, and may probably recur to it again, but the following will give a good idea of the author's style and method. Speaking of the proposed antidotes to strychnia, he observes:

"Since it is so difficult, if not impossible, to get any chemical antidote, I have thought that some agent might be met with which would counteract it physiologically.

Such an agent I expected to find in hydrocyanic acid: it acts in general in a contrary manner to that of strychnia, causing at times rather paralysis than spasm. Accordingly, I placed one-sixth of a grain under the skin of the back of a cat, and when the convulsions became apparent, and respiration had almost ceased, I poured some of the acid on the same spot. In a few seconds the spasms ceased, and the limbs, before rigid and inflexible, became quite flaccid. The animal appeared to be profoundly narcotised, but it began to respire deeply; the parietes of the chest expanding to the fullest, but the breathing was very slow. It remained in this state for several minutes, but gradually the respirations became weaker, and soon ceased in death. The effects in this case were similar to those mentioned by Pereira, who used conia instead of prussic acid. I tried the acid on others that had taken the alkaloid by the stomach; but on account of the difficulty experienced in introducing the acid into the stomach, its physiological effects were not obtained. However, considering all things, I think with the exception of chloroform and conium, that prussic acid is the best antidote we have got; but as neither the acid nor conium have been very fully inquired into, their relative merits can scarcely be decided on. Of the two prussic acid has the advantage, that it can always be easily obtained. In its use we should not be too lavish, as it even exceeds strychnia in energy, and should only be exhibited in small quantities at a time, not enough to be directly poisonous. It should, if possible, be given immediately on the ingestion of the alkaloid, or as soon as possible afterwards. It might have the effect of deadening the sensibility of the stomach to the action of the strychnia, and thus allow of time to try the stomach-pump, or emetics if this were not at hand. These latter, have not, however, been reported upon very favorably.

In extreme cases, a solution of tartar emetic might be injected into the veins, which would be a very probable means of obtaining the desired result.

If prussic acid only were given, and it were successful in preventing the spasms, its action would be temporary, and should not be trusted to alone. It might possibly have the power, by continual exhibition in small doses, of only allowing a small amount to be absorbed at a time. If it were only given after the poisonous effects became well marked, it would, in all probability, relieve the intense pain which is endured, and thus smooth the path to the grave. It could not act chemically, because the hydrocyanate is fully as powerful a poison as the pure alkaloid.

Selections from Favorite Prescriptions of living American Practitioners. By HORACE GREEN, M. D. LL. D., &c. New York: Wiley & Halsted, 351 Broadway, 1858. pp. 206, octavo.

At first glance, one would suppose from the title of this book, that Dr. Green, having had access to a number of prescription files of Apothecaries, had concluded to make a selection from them for the benefit of the physician. Such, however, is not the origin of the book. The author has for years past made it a custom to record the "favorite prescriptions" of his numerous medical friends and visitors communicated to him at his own request, these physicians representing all portions of the Union. Out of two large MSS. volumes thus gathered, he has collected the work now before us. The formulæ are arranged in a therapeutic order, beginning with *Narcotics and Sedatives, Tonics and Stimulants, Excitants and Alteratives, Cathartics and Laxatives, Emetics and Expectorants, Astringents*, &c. As it is beyond our province to judge of the therapeutical merits of these recipes, we will confine our observations to a brief notice of some of their pharmaceutical features.

In glancing over the formulæ, we observe that the author is not a strict nomenclaturist as regards our own or any other Pharmacopœia. For instance, Hydrocyanic acid is prescribed with the affix "Medicinalis," instead of "Dilutum." The London expression "Quiniæ Disulphatis" is generally employed. The Genitive of Camphora is called "Camphori;" Zingiberis, "Zinziberis," &c. Among the novelties, *Fusel Oil* is recommended as a medicine in tuberculous cases as a substitute for cod liver oil, with the effect of fattening the patient; dose from half to a drop for a child six months old, and five to ten drops for an adult. An acetic solution of strychnia is recommended as an officinal preparation of the strength one grain to the fluid ounce with five drops of acetic acid to the grain. The menstruum is water containing one-twelfth alcohol. Dose ten to thirty drops for an adult. A mixture of one part of calomel with eleven parts of sugar intimately mixed by trituration for fifteen minutes, is considered much increased in power by the commination, &c.

The formulæ are, in many instances, followed by therapeutical comments, which add much to their value and interest. The book is neatly printed on good paper, and will doubtless be valued by that numerous class of medical

practitioners who prefer the prescriptions of others to the trouble of adapting medicines themselves.

Brief Expositions of Rational Medicine, to which is prefixed the Paradise of Doctors, a Fable. By JACOB BIGELOW, M. D., late President of the Massachusetts Medical Society. Boston: Phillips, Sampson & Co. 1858. pp. 169, 12mo.

This little pamphlet is an attempt in the same direction as the work of Sir John Forbes, noticed in our last number, "Nature and Art in the Cure of Disease." Dr. Bigelow has evidently lost his early faith in the Materia Medica, and is now an advocate of "Rational Medicine," which means much or little, according to who is the exponent of its doctrines in his daily practice. With some it is practically a sort of medical atheism, where lost faith in the curative powers of medicine is not replaced by any decided system of action as a substitute. In others, it is merely placing Drugs in a subordinate position, and resorting to their aid at the proper moment, when the recuperative powers of the system need a helper. The latter is really the practice of a large number of able practitioners, who see in their course, not a new system of "Rational Medicine," but that safe middle path, which enables the physician to resort to those means, be they natural or artificial, which meet the case in hand.

The Doctor's fable is amusing, but rather verbose, and, as a piece of pleasantry, lacks spice and animation, and might have been better said; nevertheless its moral points to the subject following it.

Physician's Handbook of Practice for 1859. By WILLIAM ELMER, M. D. New York: M. A. Townsend & Co., No. 377 Broadway, 1859.

We called attention last year to this useful little medical annual, intended to facilitate the process of recording daily visits, obstetric and surgical cases, etc. in a systematic manner. Attached to the Diary blanks, and preceding them, is a very much condensed classification of diseases, and list of the materia medica, with pharmaceutical preparations, intended to revive the memory in the course of daily practice, occupying about one hundred pages. Its usefulness as a diary addresses itself to every physician, and its printed matter to those whose stock of ready knowledge needs a little aid during their daily routine.

CATALOGUE OF THE CLASS OF THE PHILADELPHIA COLLEGE OF PHARMACY

FOR THE THIRTY-EIGHTH SESSION, 1858—59.

With a List of their Preceptors and Localities.

Matriculants.	Town or County.	State.	Preceptors.
Aisquith, C. W.	Charlestown,	Virginia.	George J. Scattergood.
Allen, Harvey	Memphis,	Tennessee.	O. R. Livermore.
Bache, T. H.	Philadelphia,	Pennsylvania	
Ball, William	"	"	J. Bispham.
Bell, W. D.	Hagerstown,	Maryland.	O. S. Hubbell.
Bolton, Joseph P.	Germantown,	Pennsylvania	Dr. Wm. H. Squire.
Boyd, John W.	Cleveland,	Ohio.	Hassard & Co.
Bryan, John E.	Philadelphia,	Pennsylvania	J. C. Dawes.
Buchanan, Wm. F.	"	"	William F. Buchanan.
Bowman, Alpheus H.	St. Georges,	Delaware.	French, Richards & Co.
Carpenter, G. W., Jr.	Germantown,	Pennsylvania	George W. Carpenter.
Claypoole, John	Wilmington.	Delaware.	R. S. Christiani.
Clothier, Wm. P.	Philadelphia,	Pennsylvania	J. Lewis Crew.
Collom, Charles	Mount Holly,	New Jersey.	Wetherill & Bro.
Colman, Francis A.			Wm. Hodgson, Jr.
Cowan, J. F.			
Cowell, C. M.	Cumbrick,	N. Carolina.	Thomas Lancaster.
Creecy, Wm. Pryor	Vicksburg,	Mississippi.	Edward Parrish.
Cresswell, James A.	Newtonia,	Mississippi.	Wm. Taylor.
Dare, Charles F.	Philadelphia,	Pennsylvania	George W. Vaughan.
Davis, J. Newton	Norristown,	"	F. Zerman.
Dodson, Charles G.	Philadelphia,	"	Blair & Wyeth.
Dupuy, Powhatan E.	Richmond,	Virginia.	Frederick Brown.
Eberle, Charles L.	Philadelphia,	Pennsylvania	A. Rex, M. D.
Eyre, William	"	"	John H. Ecky.
Franklin, Thomas	Philadelphia,	Pennsylvania	Marks & Co.
Fritsch, Herman		Prussia.	Emilius Herwig.
Fronefield, Chas., Jr.	Philadelphia,	Pennsylvania	Fronefield & Co.
Garwood, William T.	Philadelphia,	Pennsylvania	Bullock & Crenshaw.
Gaskill, Aaron	"	"	Jenks & Ogden.
Geyer, H. F.	"	"	Jenks & Ogden.
Gifford, Chas. W.	"	"	John C. Savery.
Gifford, William H.	Tuckerton,	New Jersey.	Dr. R. Keys.
Gregson, John	Philadelphia,	Pennsylvania	Paul G. Oliver.
Hansell, Amos	Rancocas,	New Jersey.	French, Richards & Co.
Hansell, George	"	"	French, Richards & Co.
Harry, D. W.	Montgomery Co.	Pennsylvania	J. Henry Abbott.
Hayman, S. L.	Washington,	D. C.	Charles Ellis & Co.
Heintzelman, J. A.	Biberach,	Germany.	Dr. J. R. Angney.
Heydenreich, Emile	Soultz-sous-fovets	France.	Daniel S. Jones.
Jefferson, Charles L.	Philadelphia,	Pennsylvania	A. H. Yarnall.
Jones, William R.	"	"	Jenks & Ogden.
Keffer, Frederick A.	Philadelphia,	Pennsylvania	Beates, Jacoby & Miller.
Kemble, James	Chester Co.	"	John Goodyear.
Kennedy, Frank	Belvidere,	New Jersey.	Charles Shivers.
Kemble, Henry B.	Harrisburg,	Pennsylvania	Charles Ellis & Co.

Matriculants.	Town or County.	State.	Preceptors.
Lancaster, T. A.	Frankford,	Pennsylvania	William Hodgson, Jr.
Levy, Lewis	Trenton,	Tennessee.	Charles Ellis & Co.
Link, Ferdinand,	Wurtemburg,	Germany.	Dr. L. E. Nordman.
Lizé, Alexander A.	Rouen,	France.	A. Tatem.
McGrath, Charles	Philadelphia,	Pennsylvania	A. F. Hazzard & Co.
McIlvain, J. L.	"	"	William B. Thompson.
McKee, James H.		"	Moyamensing Dispensary.
McLeroth, Alex. H.	Chicago,	Illinois.	Edward Parrish.
Macpherson, W. Y.	Philadelphia,	Pennsylvania	Miller & Elliott.
Mecray, Alex. M.	Cape Island,	New Jersey.	Joseph C. Turnpenny & Co.
Moore, J. W.	Philadelphia,	Pennsylvania	T. Morris Perot & Co.
Morell, C. M.	Hestonville,	Pennsylvania	C. M. Morell.
Newman, George A.	Chambersburg,	"	Blair & Wyeth.
Notson, Charles B.	Philadelphia,	"	Dr. William Notson.
Noble, Thomas	"	"	Dr. James Bond.
Ott, Abraham	Philadelphia,	Pennsylvania	T. N. Penrose.
Parrish, Wm. G.		New Jersey.	Thomas J. Husband.
Petry, Emile		France.	A. B. Durand.
Pile, Wilson H., Jr.	Philadelphia,	Pennsylvania	Dr. Wilson H. Pile.
Rankin, Alfred J.	Shippensburg,	Pennsylvania	Rankin & Co.
Reel, Joseph	Philadelphia,	"	John C. Baker & Co.
Rhoads, Elam	Norristown,	"	Wm. Stahler.
Richards, George K.	Philadelphia,	"	R. C. Davis.
Robbins, James W.	Bordentown,	New Jersey.	John W. Simes & Co.
Rulon, Edwin	Swedesboro,	"	Ambrose Smith.
Scott, Henry A.	Cooperstown,	New York.	Edward Parrish.
Seeger, Roland	Philadelphia,	Pennsylvania	Caleb H. Needles.
Sheridan, John J.	"	"	R. Kilduffe.
Siddall, Robert J.	"	"	John C. Baker & Co.
Smart, Thomas H.	"	"	Henry Horn.
Smith, Theophilus H.	"	"	Beates, Jacoby & Miller.
Smith, Wm. Moore.	"	"	Caleb R. Keeny.
Smyser, George M.	York.	"	William Procter, Jr.
Thomas, Lancaster		Pennsylvania	
Thomas, J. J.	Philadelphia,	"	Robert Shoemaker & Co.
Uhler, Algernon S.	Philadelphia,	Pennsylvania	Dr. George Uhler.
Vogelbach	"	"	J. W. Bley.
Wagner, Joseph	Philadelphia,	Pennsylvania	J. Wagner.
Ward, John	"	"	William M. Reilly.
Wendel, John	"	"	John Horn.
Wilson, James	York,	"	John P. Curran
Wyeth, Frank H.	Philadelphia,	"	Blair & Wyeth.